SEPTEMBER 28, 1959

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

The Case of the Vanishing Profits

Like bush warfare, price fighting is easy to start and tough to stop. It has always been with us to some extent, but the fray grows hotter during recessions. It flared up sharply during 1958. And it's still going strong, despite the economy's upsurge. For suggestions on how to bring it under control to recover those vanishing profits, see article on Page 82

How a T-H Injunction Would Work To Get Steel Strikers Back on Jobs

Iron Ore Shortage Likely in '60 If Strike Doesn't End by Early October

St. Lawrence Seaway: Boon or Bane?

Ways Purchasing Cuts Material Costs

Products for 1975 Begin to Take Shape at International Harvester Co.

Tin Plate Hits Best Canning Pace

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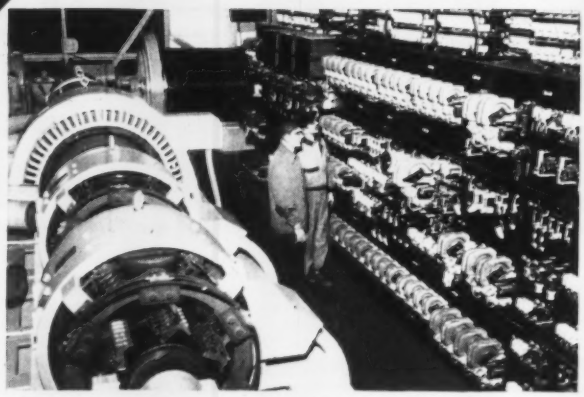
TURN PAGE

METALWORKING OUTLOOK
PAGE 69

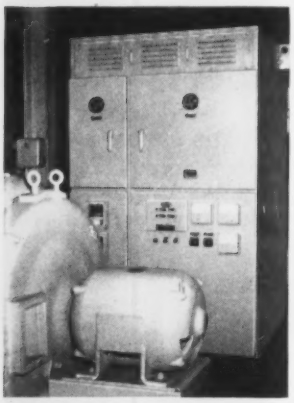
1800-TON-PER-HOUR DRAVO UNLOADER IN OPERATION AT PENNSYLVANIA RAILROAD'S GREENWICH POINT, PHILADELPHIA, ORE UNLOADING PIER

You're Under Way *Fast* WITH EC&M ADJUSTABLE VOLTAGE CONTROL!

EC&M Adjustable Voltage Control Panel *(mounted on trolley)* for Hold and Close Line Motors and for Trolley Motor, plus Protective Panel for other drives.



EC&M Control Panels for Hold Line, Close Line, Trolley, Turntable, Quadruplex Travel, Rail Clamps and Apron Hoist Motors are mounted in Machinery room, 100 feet above ground level, along with generators which supply DC power for unloader motors. Power resistors, mounted above Panels, are EC&M TAB-WELD.



EC&M Type ZHA 4160 Volt Starter provides pushbutton starting of 800 HP Elliott synchronous motor driving 4 generators.

This Dravo Unloader is typical of many prominent installations on which EC&M has worked with both unloader and motor builders to get machines into production quickly with minimum adjustment and "tune-up" time.

Equipped with a total of 20 motors ranging in size from 10 to 800 HP, this unloader takes giant-sized bites (22½ tons) of ore from a ship's hold on an average cycle handling time of 45 seconds. Frequently, the skilled operators lower the time to 36 seconds per trip.

The bucket (hold and close line motors) and trolley drive are operated by adjustable voltage control under current limit acceleration through rotating regulators. Constant potential control is used for the travel, rail clamps, turntable and apron hoist.

EC&M is prepared to supply complete equipment including control, brakes, limit stops and all rotating machinery. When planning adjustable voltage installations, consult EC&M for engineering assistance.

Photos courtesy Dravo Corporation, Elliott Company and the Pennsylvania Railroad

THE ELECTRIC CONTROLLER & MFG. CO.
A DIVISION OF THE SQUARE D COMPANY
CLEVELAND 28 • OHIO

9104

This Week in STEEL

The Metalworking Weekly

September 28, 1959 Vol. 145—No. 13

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Metalworking Pulse ▶

TURN

Metalworking Pulse

INDUSTRIAL PRODUCTION INDEX

	WEEK ENDED SEPT. 19	PREVIOUS WEEK	MONTH AGO	YEAR AGO
(1947-49=100) Based on steel output, electric power output, freight carloadings, auto assemblies	112†	103	112	137

†Preliminary.

For the first time in ten weeks, STEEL's industrial production index took a turn for the better. But it was only the normal reaction to post-Labor Day activity and startup of new model auto production.

Details on Page 99

U. S. PASSENGER CAR PRODUCTION

	WEEK ENDED SEPT. 26	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Number of units assembled	100,000*	61,734†	18,335	42,599

(Source: Ward's Automotive Reports.) *Estimated. †Preliminary.

If there is enough steel, automakers will climb quickly to the best production rate of the year. But there are indications that this can't last long. Metal shortages already are causing some slowdowns at GM.

Details on Page 96

NATIONAL STEEL INGOT PRODUCTION

	WEEK ENDED SEPT. 27	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Net tons (thousands)	354*	356	332	1,816
Index (1947-49=100)	22.0*	22.0	20.7	113.0
Percentage of capacity	12.5*	12.6	11.7	67.3

*Estimated by STEEL; comparative figures reported by AISI.

Mills produced an average of 338,500 tons a week during the first ten weeks of the strike. That is considerably less than a day's output at the rate maintained during the first half of the year.

Details on Page 178

STEEL SCRAP PRICE COMPOSITE

	SEPT. 23	WEEK AGO	MONTH AGO	YEAR AGO
Based on No. 1 heavy melting grade at Pittsburgh	$41.00	$41.00	$38.33	$43.00

Widespread belief that mills will make large purchases as soon as they resume full operations is maintaining strength in the market. A strong counteracting factor is rapidly rising stocks.

Details on Page 191

FINISHED STEEL PRICE INDEX

	SEPT. 22	WEEK AGO	MONTH AGO	YEAR AGO
Based on Bureau of Labor Statistics data (1947-49=100)	186.7	186.7	186.7	186.6

Importers have advanced prices on most products, sharply on such items as major grades of sheets, hot rolled bands, and wire. Structurals and oil country tubular goods are steady. Deliveries extend three to four months.

Details on Page 179

We make them all

These tags suggest just a few of the many kinds of steel wire we make at our modern wire mills. Some are ordinary types of wire, others are for special purposes. And whether it's low- or high-carbon wire, bright, annealed, galvanized, or bethanized . . . we pay the strictest attention to all of the important details that mean top-quality steel wire.

At your convenience, we'd like to talk over your wire needs. Quite often we can help our wire customers to turn a problem into a profit. Just phone our nearest sales office for full details.

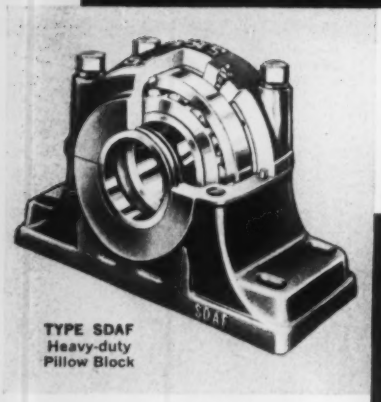
BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

TYPE SAF
Ball or Spherical Roller
Bearing Pillow Block

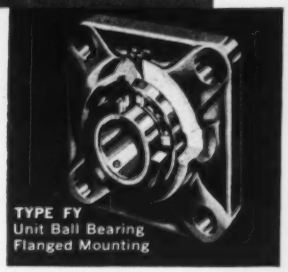
Can you get these "special" qualities in "standard" pillow blocks?



TYPE SDAF
Heavy-duty
Pillow Block

TYPE SY
Unit Ball Bearing
Pillow Block

TYPE SRB
Unit Rubber-Ball
Bearing Pillow Block



TYPE FY
Unit Ball Bearing
Flanged Mounting

Most pillow blocks offer easy assembly and rugged housings. But can they offer you low friction, self-aligning bearing operation and efficient sealing as well?

They can—if they're the SKF* pillow blocks, and flanged mounting, shown here. Type SAF, for example, comes equipped with low-friction ball or spherical roller bearings that are *inherently* self aligning. And these bearings are effectively protected by Triple-Seal rotating rings. Abrasives and corrosives can't get to them—oil or grease can't drip out.

Yet this is a standard SKF pillow block, that is competitively priced in spite of its combination of extra features. We make it for shaft sizes from ¾" to 10½", for mounting directly or with an adapter. A cast steel housing (SAFS) is available for heavy duty applications.

For details, call one of our twenty-four offices. 5938

Spherical, Cylindrical, Ball, "Tyson" Tapered and REED Miniature Bearings

EVERY TYPE—EVERY USE

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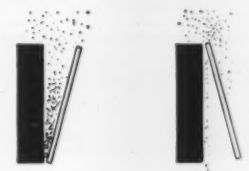
SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

*REG. U.S. PAT. OFF.

enough dirt to stop an ordinary D-C magnetic brake

Clark's exclusive design feature, magnet hinged at the top, gives the Clark D-C Magnetic Brake an important advantage over ordinary magnetic brakes where the magnet literally forms a wedge-shaped dirt trap.

From the diagrams at right you can see for yourself how important this difference can be for dependable, maintenance-free brake operation in dust and dirt saturated mills and industrial plants.



ORDINARY BRAKE

CLARK BRAKE

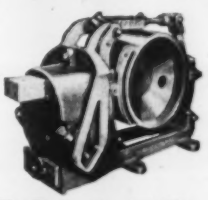
In the Clark Brake, because the widest part of the gap between magnet and armature is at the bottom, any dirt which does get through the smaller gap at the top falls through harmlessly.

Not so with an ordinary brake. Here, because the widest part of the gap between magnet and armature is at the top, dirt not only has easier access into the magnet gap and linkages but it is more likely to pack at these points. When this happens the brake's operation stops . . . production comes to a halt.

And you won't find the operating linkage and adjusting mechanism on the Clark D-C Magnetic Brake buried down in the frame and under the wheel as with ordinary D-C brakes. It's at the top — away from ankle-high dirt in mills and plants—where it is openly accessible for easy inspection and quick adjustment when required.

For more details on the extraordinary Clark D-C Magnetic Brake see your nearest Clark Controller sales representative. Or write direct to Clark Controller.

9MB1



The **CLARK CONTROLLER** *Company*

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IN CANADA: CANADIAN CONTROLLERS, LIMITED • MAIN OFFICES AND PLANT, TORONTO

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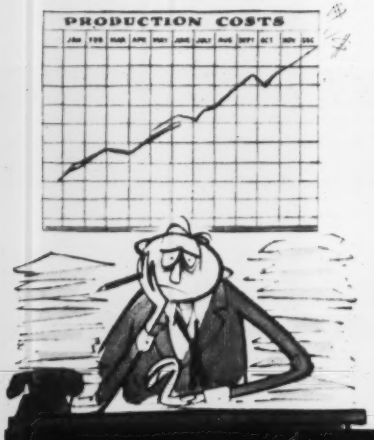
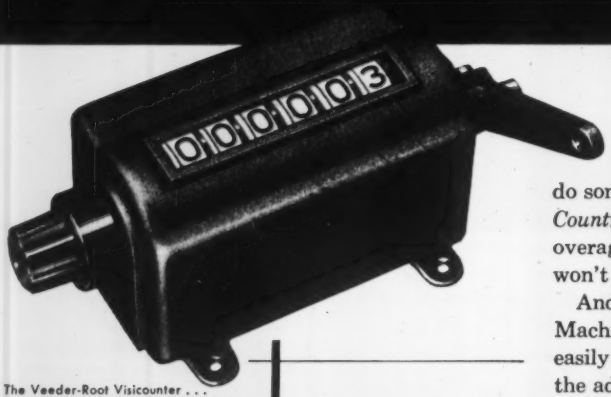
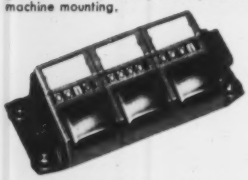


KEEP EVERYTHING UNDER COUNTROL



The Veeder-Root Visicounter . . . Specially designed with large easy-to-see figures for plant use. Features ruggedized, one-piece case, 6 non-overthrow wheels, choice of ratchet or geared models, and styles for panel or machine mounting.



Veeder-Root Vary-Tally . . . Handy line of reset counters that can be used singly or assembled "building-block" fashion to countrol operations and costs throughout the plant. Check hand assembly, traffic, paperwork, telephone calls, orders, stock and many others.

General-Purpose Magnetic Counter . . Ideal for solving "tricky" counting problems. For remote indication. Has 6 wheels, handles up to 1000 counts per minute. Base mount shown, panel mount also available.

When you know what goes on — you can do something about it! That's the reason for using *Countrol*. With a Veeder-Root counter on the job, overages, shortages or production "guess-timates" won't boost costs.

And Maintenance costs can be *Countrolled*, too! Machine cycles, "mileage", hours or operations can easily be calculated for planned servicing — all by the addition of a Veeder-Root Counter.

Anytime a machine or a product moves, there's a Veeder-Root Counter that can be used to keep costs under *Countrol*. Contact your local Veeder-Root Distributor or write for more information.

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VR9-44

Please direct all correspondence to attention of Ed Service, STEEL, 1213 W. Third St., Cleveland 13, Ohio. September 28, 1959

More than a Wishing Well

"The most alert business management in the world regards financial support of higher education as of the first importance," avers Frank H. Sparks, former president of Wabash College, now president of the Council for Financial Aid to Education Inc., New York.

Associate Editor George Howick dove into higher education's financial pool and found lots of evidence that industry's leaders follow Mr. Sparks's beliefs. Here are some of the facts that George brought to the surface: Of every dollar contributed annually by industry, 28.4 cents is poured into education . . . Corporations provide one-seventh of all grants to higher education . . . In 1958, while nearly becalmed in the financial doldrums, industry gave 23.5 per cent more to education than it did in booming 1956.

For the complete story, with an examination of the return ripples created by this huge stream of money, see next week's STEEL.

Chicago and Cleveland Changes

The two editors pictured above, Bill Dean, left, and Austin Brant, will switch cities Oct. 1.

Bill, a Chicago resident editor for five of his six years with STEEL, is best known for the major news stories he has filed from the Midwest. This year, he wrote the entire Program for Management series. His new job in Cleveland will be news editor.

Austin, our newest resident editor, has been handling technical stories about metal fabrication, heat treating, and materials for five years. He also researched STEEL's Metal Selectors and edited our New Products and Equipment pages.

What Writers Read

Following in Austin's footsteps as editor of New Products and Equipment is Assistant Editor John Teresko. One of his daily jobs will be screening hundreds of news releases to give you the latest information on innovations in design, machines, and processes.

On his first pass at the job, John unearthed some copy for Ed Service—it lends itself to this simian introduction:

If You Put Six Apes . . .

. . . in a room with paper and typewriters, they would, given sufficient time, rewrite all the printed matter in existence—at least Russell Maloney used that theme in his short story, "Inflexible Logic."

But there's no need for that random approach. Here's the latest wrinkle. We quote the release: "The Ernest Hemingway of the technical writing craft may well be an electronic brain such as the digital computer that thought out and edited a 511 page book published by Pratt & Whitney Co. Inc., West Hartford, Conn. Like Hemingway, the computer writes in a language of precision, without excessive adjectives. Instead of colorful prose, the computer speaks a numeric language—to 15 decimal places with absolute accuracy.

"The title of the 4½ lb volume is *Angular Indexing Tables*, and the author is the Bendix General Purpose Digital Computer. The book provides tabulations for dividing a circle into any number of equal divisions from 2 to 210 inclusive. The electronic author logged 112 hours in accomplishing the task. It is estimated that two crackerjack mathematicians would have needed a year or two, working 8 hours a day, to perform the same feat."

You Win the Marbles

"Recently one of my associates stated that his father worked in a steel mill in Utah in the late 1800s," writes Jack E. Cole, sales manager, Equipment Sales Div., Raybestos-Manhattan Inc., Bridgeport, Conn. "It was my contention that there were no steel mills in Utah before 1900. The

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EX-CELL-O FOR PRECISION
59-41

argument became heated and a wager was made. Do you have factual knowledge that would settle this difference of opinion?"

None of our records shows any steel mills operating in Utah before 1900, Jack. There were blast furnaces though. One thing: Ogden Iron Mfg. Co. started to build a rolling mill (possibly for rolling rails) at Ogden City in 1875 and completed it in 1882. It appears to have never been put in operation. In 1884, the machinery was moved to Pueblo, Colo., where it was added to the plant of the Colorado Coal & Iron Co.

Depreciation,

Or the March to Oblivion

The fading beauty's sagging face,
Is once more lifted into place.
She hopes it will again erase,
Each tell-tale line.

Hers is the universal fate,
It comes to all, comes soon or late:
Grow old, wear out, depreciate,
Decay, decline.

We all hear time's relentless tread—
How to escape, how get ahead?
"Not by repairs," the Shopman said,
"Not yours nor mine."

How can we live and how renew?
Throw out the old, bring in the new.
What if the dollars are too few,
And come too late?

The tax man should abate his greed—
We'll share the harvest, not the seed,
And still we'll meet each budget need,
At proper rate.

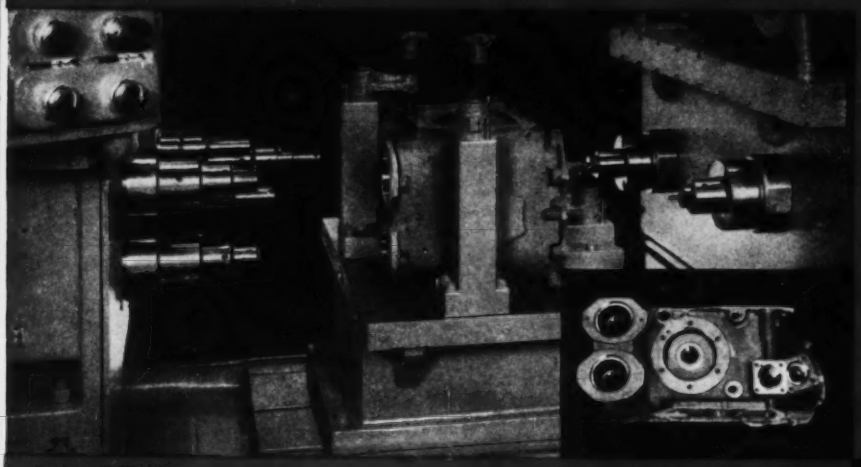
For each shall through the other thrive,
In industry's great, humming hive—
We are not static, we're alive!
Accelerate!

From "High-lights," American Economic Foundation.

Our old friend, Maurice E. Peloubet, is the author of those lines. He's the New York accountant and expert on depreciation whose views on reform our editors have often reported.

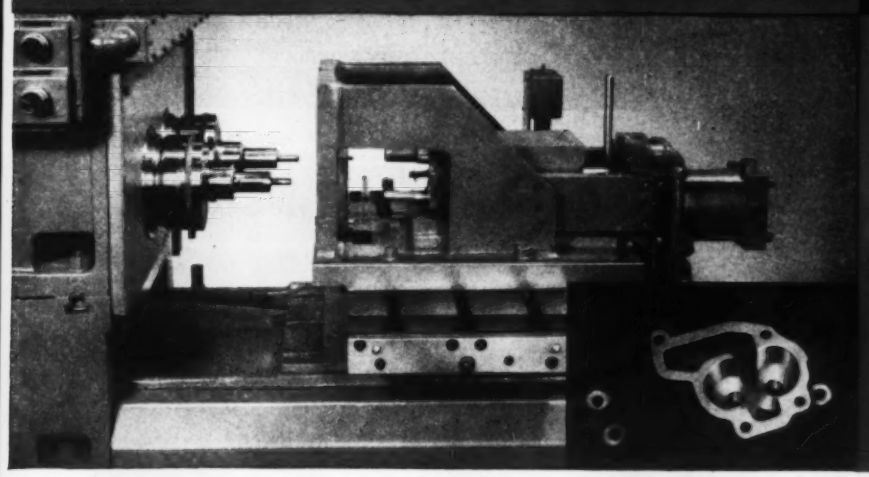
They'll be reporting still more on depreciation in the months ahead. Coming up are House Ways & Means Committee hearings on general tax revisions, and Mr. Peloubet will be one of several testifying on depreciation. And early in 1960, STEEL has something special cooking to help persuade Congress—and industry—that reform is urgently needed.

Standard Ex-Cell-O Precision Boring Machines



. . . FOR FASTER MULTIPLE-HOLE WORK

Standard style 17-A performs 26 operations in one cycle on a magnesium aircraft casting. Machine bores five bronze bushings, counterbores seven diameters, faces four surfaces and chamfers eight shoulders with five spindles at left, two spindles at right.



. . . FOR FASTER CLOSE-TOLERANCE WORK

Style 112-D finish-bores gear pockets and shaft holes, and plunge-faces pocket bottoms of oil pump bodies to tolerance of plus or minus .0005". Flat faces are square to the bores and parallel to each other within working limits of .001".

59-17

10 REASONS WHY EX-CELL-O PRECISION BORING MACHINES DO MORE, AT LESS COST!

1. RUGGED—Heavily-ribbed base castings, chatter-free hydraulic-actuated table movement, isolated power assembly.
2. FLEXIBLE—Bridges easily spaced-out for large work, moved in for smaller parts.
3. VERSATILE—Inbuilt versatility, plus Universal Fixtures for toolroom work, short-run and production jobs. Spindles mount in any position.
4. FAST—Rapid table traverse, positive spindle brakes and quick-load fixtures for high output.
5. LOW TOOLING COST—Standard machine components, tools and accessories cut lead time, speed setup.
6. AUTOMATIC LUBRICATION—Separate lubricating system pumps oil directly to the ways.
7. SEALED SPINDLES—Ex-Cell-O Precision Spindles permanently lubricated during assembly.
8. CONVENIENT CONTROLS—Easy to use hydraulic controls contained in a single panel.
9. TROUBLE-FREE—Vital machine parts and controls protected from dirt, chips, coolant. Ready access to components for inspection.
10. CAMS FOR CONTOURING—Cam-operated boring machines available for precision contouring work.

Call your local Ex-Cell-O Representative, or write direct for complete details on the full line of Ex-Cell-O Precision Boring Machines.

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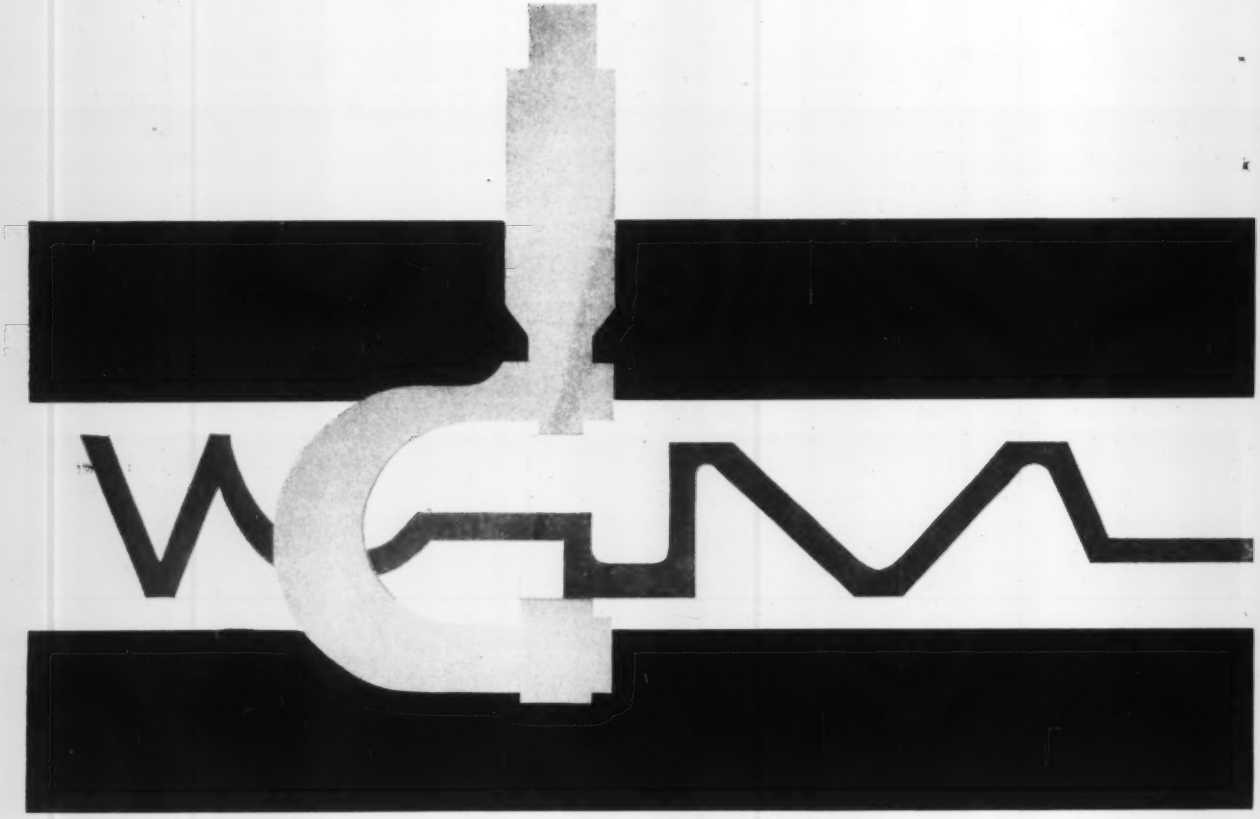

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A. M. Castle & Co.
LUdlow 9-6611

LOS ANGELES 22
Jones & Laughlin Steel Corp.
RAymond 3-4581

SAN FRANCISCO 19
A. M. Castle & Co.
ATwater 2-6920

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KEystone 4-5151

FLORIDA
FT. LAUDERDALE
Caulley Steel & Supply Co.
LUdlow 3-7650

MIAMI
Caulley Steel & Supply Co.
PLaza 4-2754

ORLANDO
Caulley Steel & Supply Co.
GArden 5-3528

GEORGIA
ATLANTA
Atlantic Steel Co.
TRinity 5-3441

ILLINOIS
CHICAGO
A. M. Castle & Co.
NAtional 5-6411

CHICAGO 39
Guardian Aluminum Sales, Inc.
NAtional 2-5808

CHICAGO 32
Lafayette Steel & Alum. Corp.
LAfayette 3-7632

LOUISIANA
NEW ORLEANS 9
Woodward Wight & Co. Ltd.
TUlane 2471

MARYLAND
BALTIMORE 11
Brass & Copper Supply Co. Inc.
BElmont 5-1500

BALTIMORE 24
A. M. Castle & Co.
DIckens 2-4000

MASSACHUSETTS
BOSTON 10
Kelco Metal Products Co.
HUbbard 2-1737

WORCESTER
Kelco Metal Products Co.
PLeasant 3-7625

MICHIGAN
DETROIT 34
Production Steel Products Inc.
TW. 3-5000

MINNESOTA
MINNEAPOLIS 14
Keelor Steel, Inc.
FEderal 3-4291

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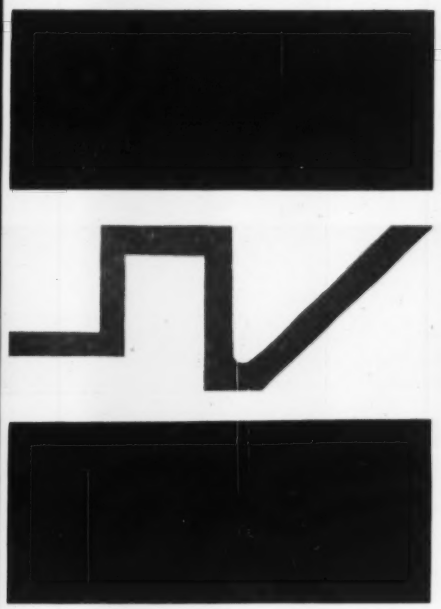
GRand 1-3666



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- **The fastest possible service**
- **Aluminum to meet your precise requirements**
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- **Expert technical assistance, backed by the metallurgical facilities of Olin Aluminum, a major, fully-integrated producer**

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MElrose 4-1492

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Follansbee Metals Co.
FEderal 1-8200

PHILADELPHIA 31
North American Brass & Copper Inc.
TRinity 8-5300

PHILADELPHIA 34
Steel Distributors, Inc.
GArfield 3-9300

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KNOXVILLE
Steel Supply Co.
MYrtle 1-1163

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ANNISTON
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ADams 7-3585

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ANgeles 3-7575

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WILMINGTON 99
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(See listings under Mill Prod. Distr.)

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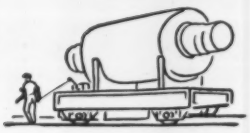
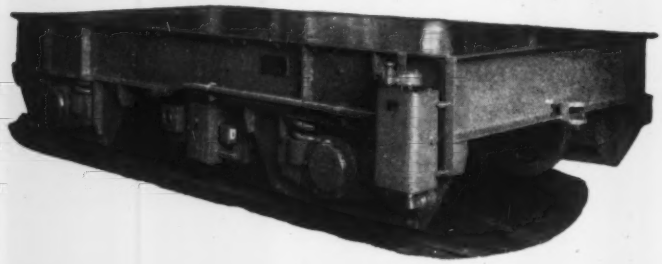
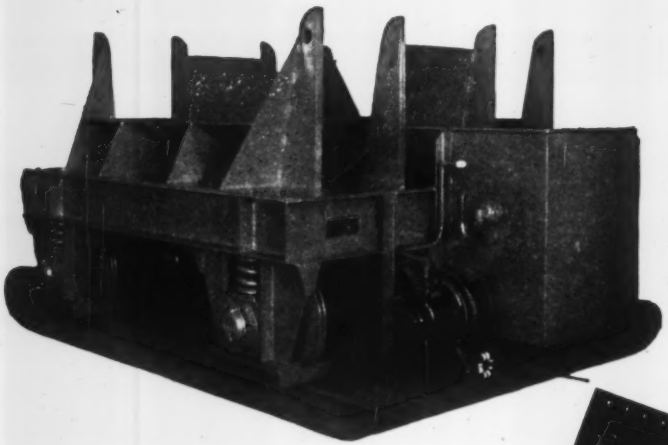


Atlas Safety-Type Transfer Cars are outstanding for moving heavy materials over short distances. Designed for storage battery, diesel or gas-electric, or cable reel service. Only one simplified control lever for safety. The car moves only when the operator holds the lever.



50-TON STORAGE BATTERY FLAT CAR



64-TON ELECTRIC FLAT CAR

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CALENDAR OF MEETINGS

Sept. 28-29, American Management Society: Special marketing conference, Manhattan Hotel, New York. Society's address: 1515 Broadway, New York 36, N. Y.

Sept. 28-Oct. 1, American Welding Society: National fall meeting, Sheraton-Cadillac Hotel, Detroit. Society's address: 33 W. 39th St., New York 18, N. Y. National secretary: Fred L. Plummer.

Sept. 28-Oct. 1, Association of Iron & Steel Engineers: Annual meeting and convention, Sherman Hotel, Chicago. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

Oct. 4-7, National Association of Sheet Metal Distributors: Annual meeting, Atlantic City, N. J. Association's address: 1900 Arch St., Philadelphia 3, Pa. Executive secretary: Thomas A. Fernley Jr.

Oct. 5-7, Material Handling Institute Inc., Industrial Truck Association, Association of Lift Truck & Portable Elevator Manufacturers, Monorail Manufacturers Association: Joint fall meettings, Lake Placid Club, Essex County, N. Y. Information: Hanson & Shea Inc., 1 Gateway Center, Pittsburgh 22, Pa.

Oct. 5-7, Truck Body & Equipment Association Inc.: Annual convention and exhibit, Sherman Hotel, Chicago. Association's address: 1616 K St. N.W., Washington 6, D. C. Executive manager: Arthur K. Nuesse.

Oct. 5-9, Society of Automotive Engineers: National aeronautic meeting, aircraft manufacturing forum, and engineering display, Ambassador Hotel, Los Angeles. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Oct. 6-7, Powder Metallurgy Parts Manufacturers Association: Fall meeting, Sheraton-Cadillac Hotel, Detroit. Information: Hanson & Shea Inc., 1 Gateway Center, Pittsburgh 22, Pa.

Oct. 7-9, American Vacuum Society Inc.: Symposium on vacuum technology, Sheraton Hotel, Philadelphia. Society's address: Box 1282, Boston 9, Mass. President: A. J. Gale.

Oct. 7-9, Gray Iron Founders' Society Inc.: Annual meeting, Fairmont Hotel, San Francisco. Society's address: 930 National City-E. 6th Bldg., Cleveland 14, Ohio. Executive vice president: Donald H. Workman.

Oct. 7-10, American Society of Tool Engineers: Semiannual meeting, Chase-Park Plaza Hotels, St. Louis, Mo. Society's address: 10700 Puritan Ave., Detroit 38, Mich. Executive secretary: Harry E. Conrad.

GAYLORD POINTS OUT
MANY WAYS YOU CAN SAVE IN PACKAGING

Gaylord uses a sharp pencil to survey your *total* packaging operation—checks those hidden costs that are frequently more important than the price of the box.

If you demand increased production, improved protection and important savings in corrugated packaging . . . call in your G-man. He'll help you erase any packaging errors, leave an indelible mark on the credit side of the ledger.

GAYLORD
CONTAINER CORPORATION

Gaylord Boxes

HEADQUARTERS, ST. LOUIS
PLANTS COAST TO COAST

DIVISION OF **Crown Zellerbach Corporation**

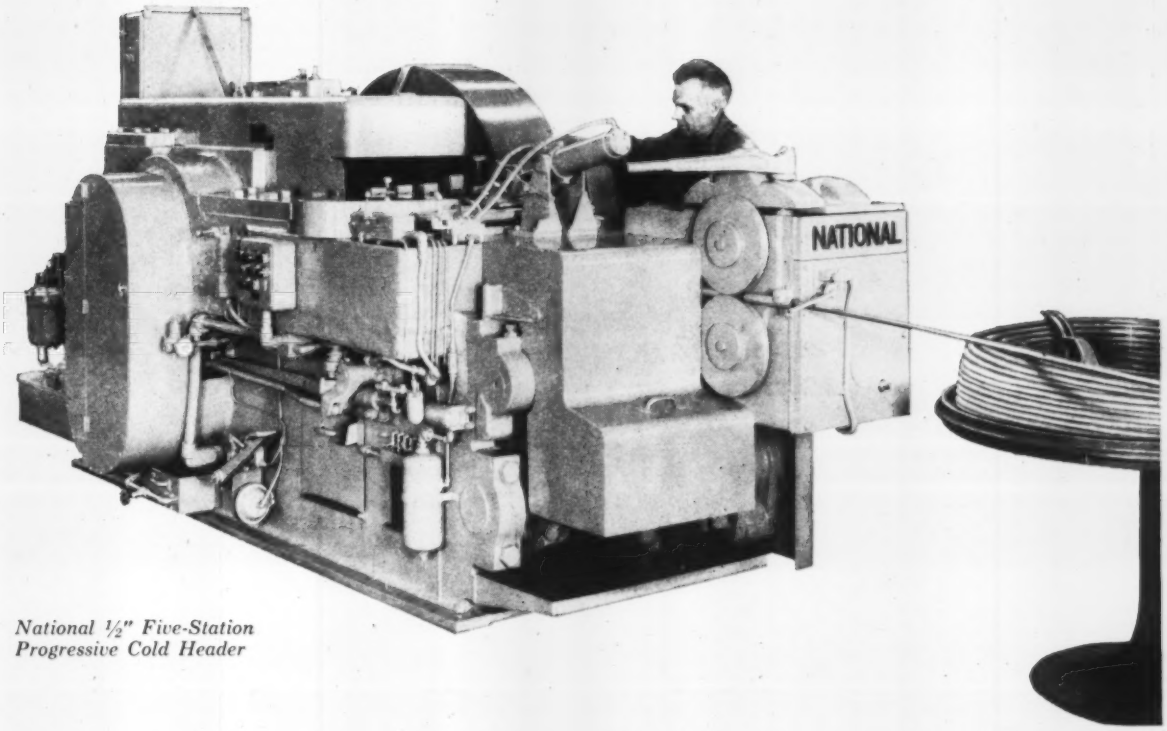
Top row, left to right: piston pin, wheel nut, ball stud, pump shaft, faucet stem.
Middle row: spark plug body, eye bolt, shuttle tip, ball socket, universal joint bearing cup, splined square-head shaft.
Bottom row: tube nut, tappet plunger, hollow rivet, blind rivet, distributor cap insert, commutator bar.

These are typical parts you can make to advantage, not by wasteful cutting, but by *cold heading* — flowing metal into accurate shapes. All of the above jobs, with one exception, were made complete from coiled wire to finished part, without intermediate annealing and coating, *in one compact machine!*

Why are formerly difficult-to-head jobs like these not only possible now, but commercial? The answer is teamwork, on many fronts. For example:

(1) More versatile metals are now available in coiled wire. (2) Die materials and lubricants are still better. (3) We are getting important (to us) but usually insignificant concessions from cold-heading-minded parts designers. (4) National Cold Headers, multiple-die Progressive Headers, Cold Formers

The modern way to make Metal Parts faster, stronger, to amazingly close dimensions!



National ½" Five-Station Progressive Cold Header

and Boltmakers, backed by our fast-growing engineering experience, are now specially equipped to produce reliably the formerly difficult jobs like these shown here.

Are your production problems like these? Perhaps cold heading could pay off for you in a remarkably short time. Let's find out.

Here is our service to metalworking, and you are under no obligation to buy. Send us samples or prints of your jobs. Better yet, bring them to Tiffin where more of our experienced people can participate in *your* problem.

We shall be happy to work with you in developing that better method.

Founded 1874—DESIGNERS and BUILDERS of MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS CO-PIONEERS WITH INDUSTRY OF ADVANCED METALWORKING PRODUCTION METHODS

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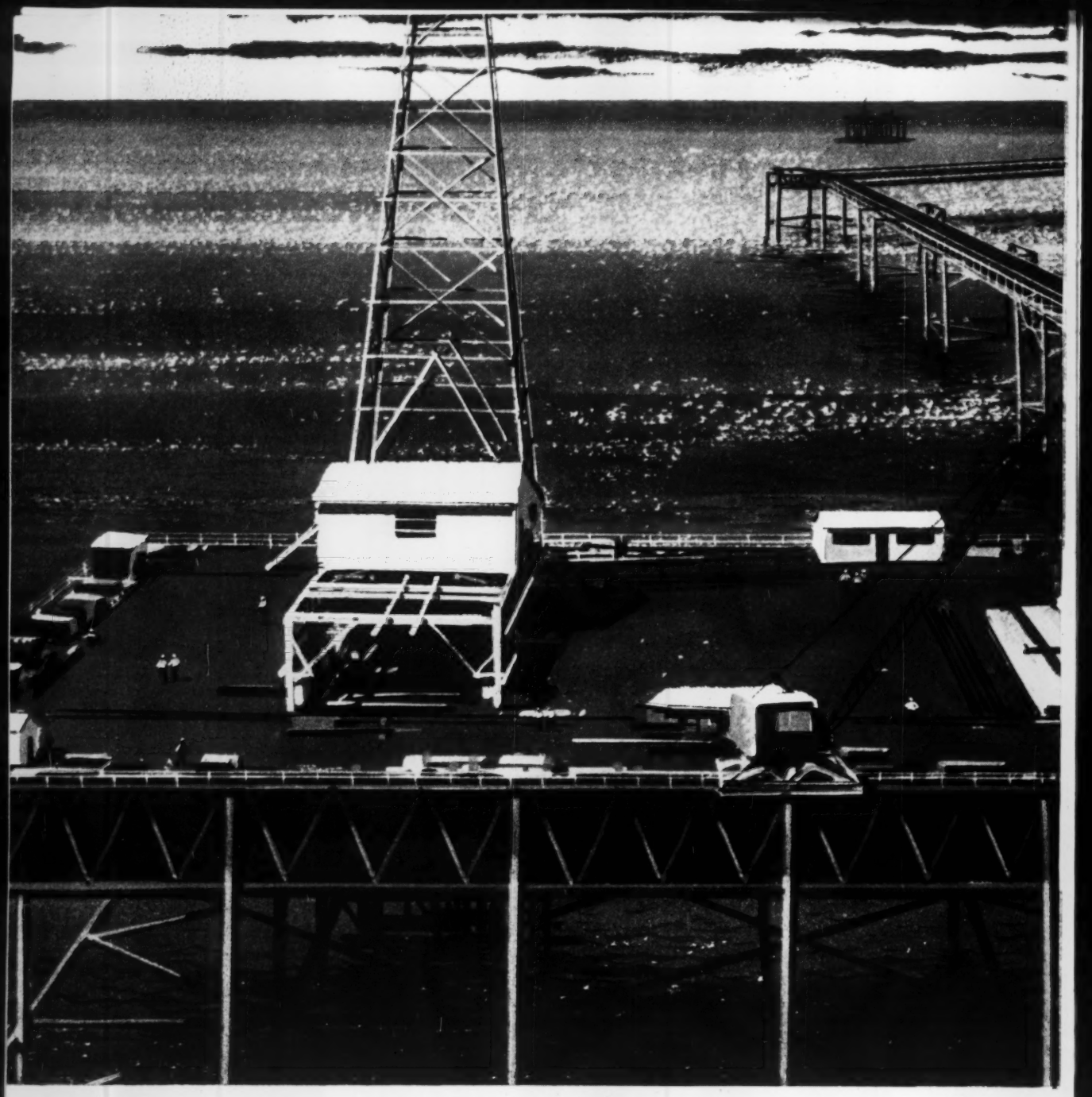
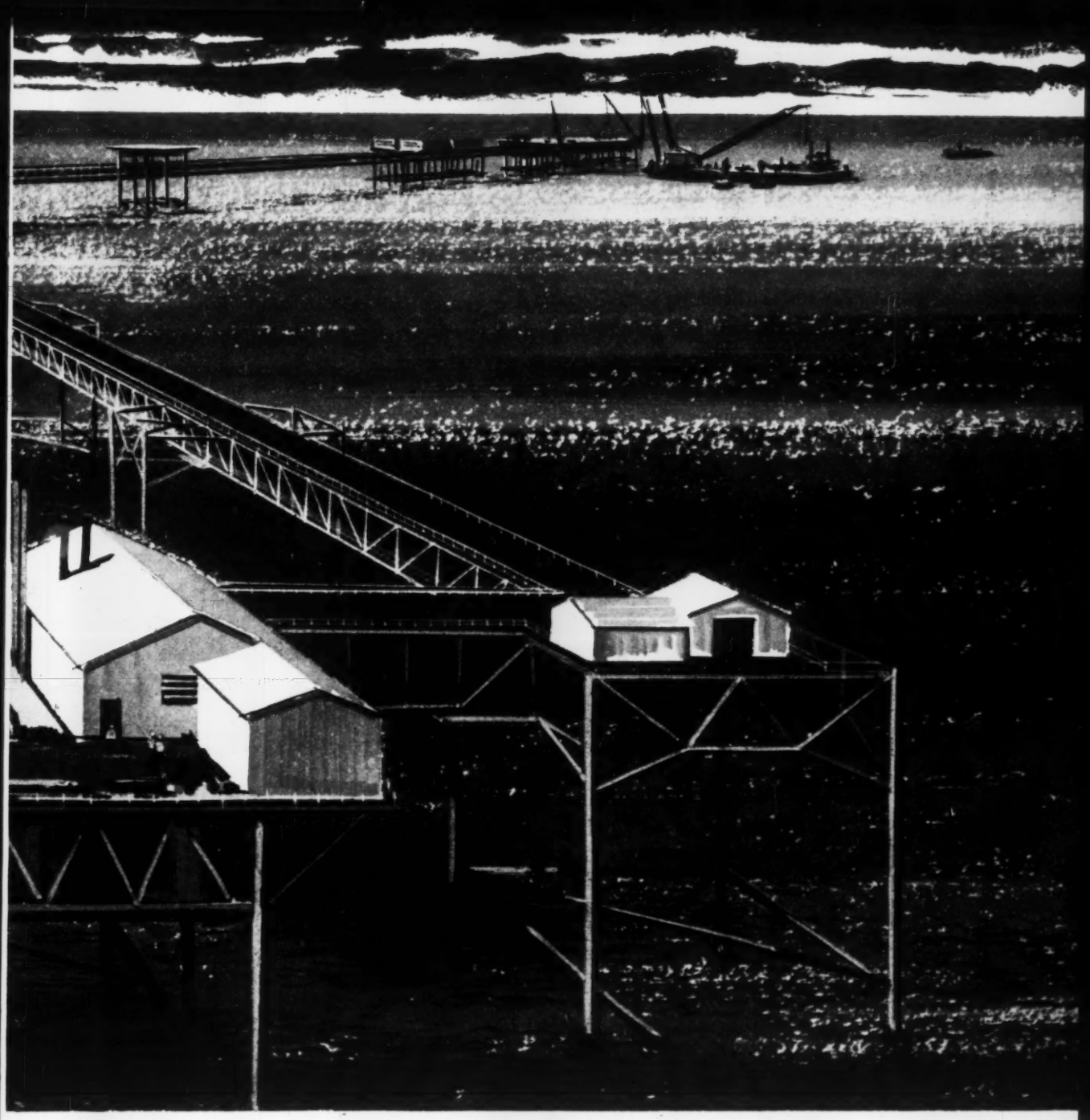


Biggest man-built island

SEVEN miles off the coast of Louisiana, reaching 220 feet below and rising 60 feet above the Gulf of Mexico, is a massive steel island. It's the world's first offshore sulphur mining plant.

This mine is a project of the Freeport Sulphur Company, and is scheduled to open in 1960. Known as the *Grand Isle*, it will be one of the world's largest sulphur mining operations. The Frasch process will be used. Every day, 5 million gallons of sea water, heated to 325°F., will be injected into the underground sulphur deposit. Hot water melts it. Compressed air will force the liquid sulphur to the surface.

The Gulf of Mexico brews black storms. Vicious storms. But this mile-long structure is built to take the brutal pun-



ishment of the sea. From end-to-end, it's braced with tons of heavy-wall pipe from National Tube.

National Tube is also supplying casing, line pipe and standard pipe for the completion of this project. For more than 80 years, National Tube has handled tough tubular installations in the fields of line pipe, marine piping, mechanical tubing and oil country tubular products. Write us for assistance. National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

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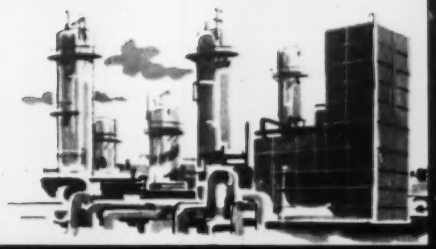

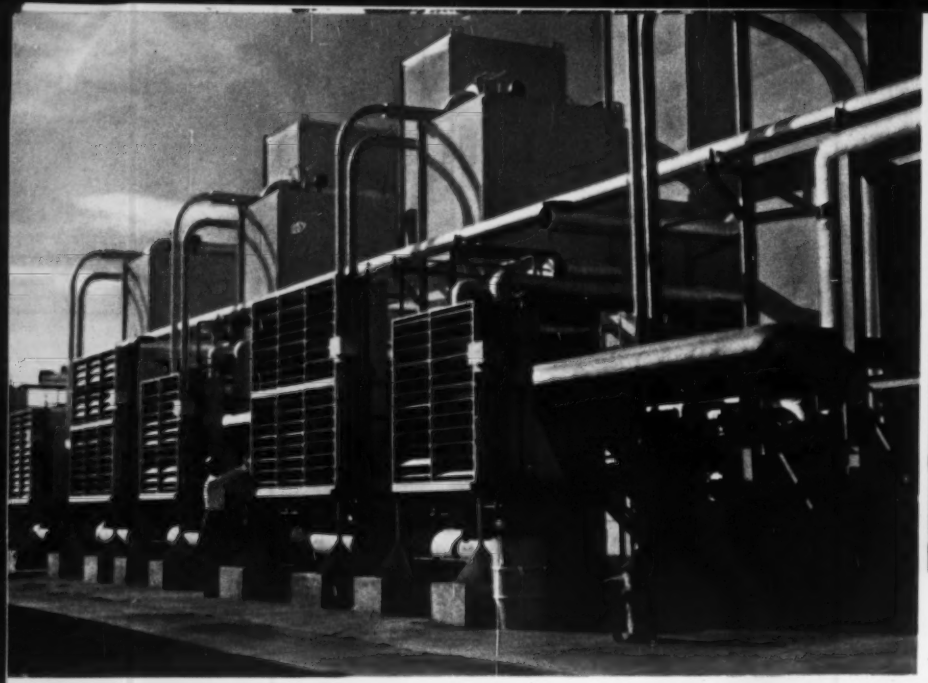

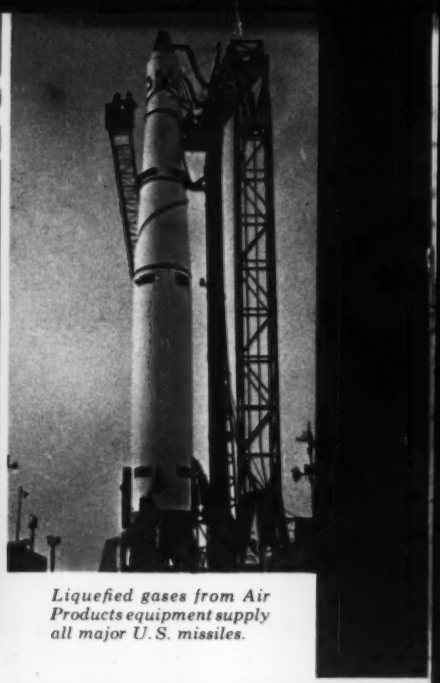

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YOU will find here tangible evidence of a growing technology. Applying "Cryogenics" (the science of low temperatures) and engineering broad new routes to low-cost, high-purity industrial gases is the main business of Air Products.

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In the blast furnace, the open hearth and the new converter processes — Air Products oxygen efficiently increases steel mill capacity. Annealing nitrogen and other gases are also provided on a low-cost tonnage basis.

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Air Products pipeline oxygen serves the Basic Oxygen Furnace Process.

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Air Products is the world's leader in APPLIED CRYOGENICS — the practical and profitable use of low-temperature science for industry.

Perhaps this CAPACITY can help solve your problems — in cryogenics, in industrial gas supply systems, or in some new area where "ground rules" are yet to be established.

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... from pilot operation to tonnage production through Air Products CAPACITY

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* To put entire gas supply complexes to work for you *without capital investment on your part.*

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New Norton advancements for barrel-finishing!

TUMBLEX* abrasive now available in "RP" and "TP" pin shapes for finer, faster finishing of intricate parts

New TUMBLEX "RP" (Round Pin) abrasive, size 3/8" diameter x 5/8" length, is ideal for finishing a retainer ring with round holes on sides and ends.

New TUMBLEX "RP" (Round Pin) abrasive, 3/16" diameter x 5/8" length, is exactly the right size and shape to reach all areas of cylindrical serrated missile part with center hole.

Like the long popular TUMBLEX "T" (Triangles) and "S" (Spheres) barrel-finishing abrasives, the new "RP" and "TP" types are made of bonded ALUNDUM* abrasive — fast-cutting and lustre-giving. Their round and triangular pin shapes are particularly designed to remove burrs and improve surface finishes on parts with holes, slots, serrations and other hard-to-contact recesses — and to bring you "Touch of Gold" advantages including shortest time cycles and lowest cost-per-piece finished.

Send samples of parts you finish — large or small, simple or intricate — to our Sample Processing Department. We'll barrel-finish with the new "RP" or "TP" abrasive, or with any more suitable TUMBLEX type and tell you the abrasives, methods and equipment you need most. NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

New TUMBLEX "TP" (Triangular Pin) abrasive, 3/8" side width x 1" long, gives faster, smoother finish to slotted and notched hydraulic valve unit.

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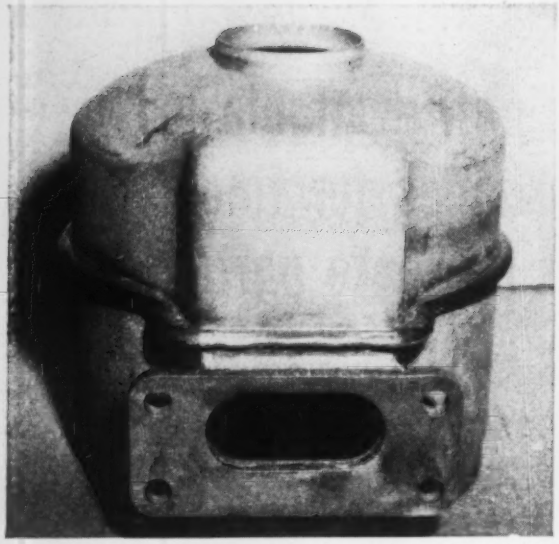


Arc-welded pressed-steel assembly, left, weighs only 11½ lbs.; iron casting formerly used, right, weighed 26¼ lbs.

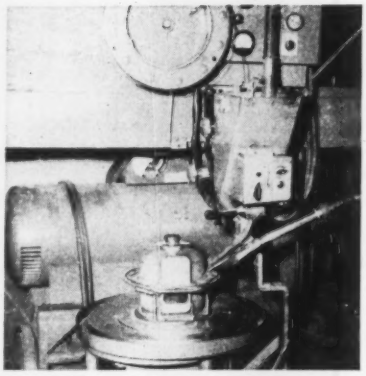
White spots on the casting are blow holes that were repaired by cold-soldering.

REDESIGNED FOR WELDING, AIR CLEANER COSTS 36% LESS

Reduction in weight of 56 pct, unit cost saving of 35.8 pct and a cut in manufacturing rework from 25 pct to 3½ pct; all three were realized by a change from cast iron to arc-welded pressed steel air cleaners for Caterpillar construction and mining equipment.

The cleaners are basically a 9-in. diam. cylindrical body attached to a central cover shell carrying a mounting flange and a top dome or cover with a 2½ in. neck for the intake tube. Originally the two elements of the dome were made as a casting weighing 26¼ lbs. Connections to the center tube and lower body were soldered, which required first dip-tinning the casting.

Leaks in the soldered joints, along with pinholes and porosity in the casting after machining, ran as high as 25 pct during 10-lb. air pressure testing; subsequent cold-soldering repairs had to be made. Beyond this, breakage of castings in handling and transporting often ran up to 5 pct.



Cover halves clamped in fixture are rotated under LINCOLNWELD submerged-arc welding head. The 34-in. weld takes 30 seconds.

In the redesign, the dome shells are formed from 2 flat blanks of 12 gauge steel. After trimming and punching, they're welded automatically on a Lincolnweld submerged-arc automatic welder.

DESIGN AIDS AVAILABLE

The new 11th edition of "Procedure Handbook of Arc Welding Design and Practice" has 240 pages on Machine Design. An authoritative work, the "Procedure Handbook" is written to help the machine designer achieve the most efficient use of welded steel. The price is $3.00, $3.50 outside the U.S.A. The book may be ordered from The Lincoln Electric Co.

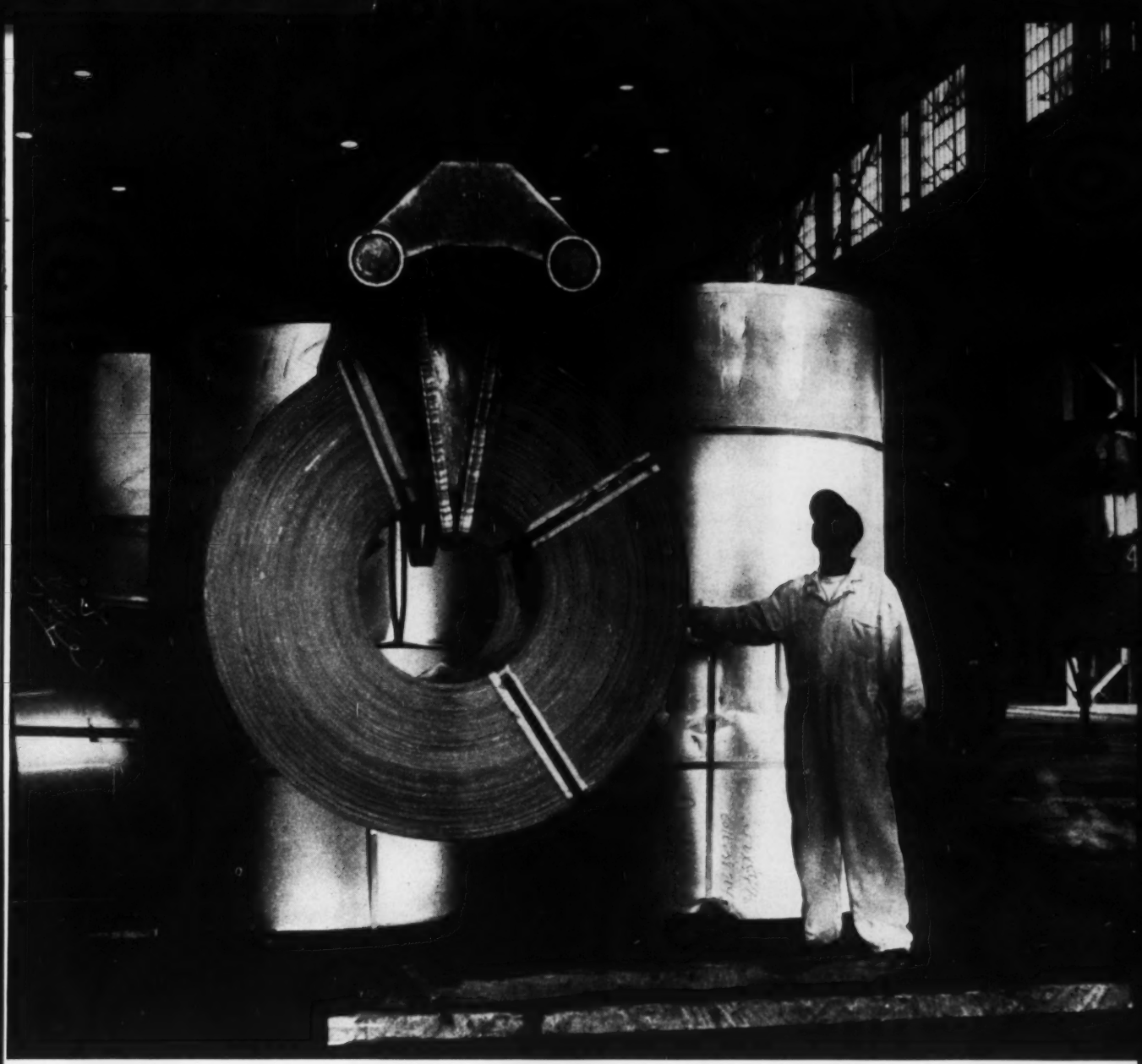
Machine Design Seminars are conducted regularly at the Lincoln plant. Write for dates and information.

THE LINCOLN ELECTRIC COMPANY

Department 1657 • Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment

LINCOLN ...USA



INSTANT STEEL

A CALL TO YOUR LOCAL STEEL DISTRIBUTOR ENDS IN-PLANT SHORTAGES FAST!

Emergency? Your steel service center can end it in a hurry with practically any amount, quality, size or shape of steel you may need. No more in-plant steel shortages—no more plant shutdowns—no more lost contracts.

Or you may choose to use his facilities, stocks and fast delivery service on a regular basis. Whatever your production needs, your local steel distributor is on hand ready to give instant service. All you have to do is phone.

Call him for any quantity of Weirkote continuous-process zinc-coated sheets, Weirzin electrolytic zinc-coated sheets, hot- or cold-rolled sheets or any type of steel you may need for any type of production job.

WEIRTON STEEL COMPANY

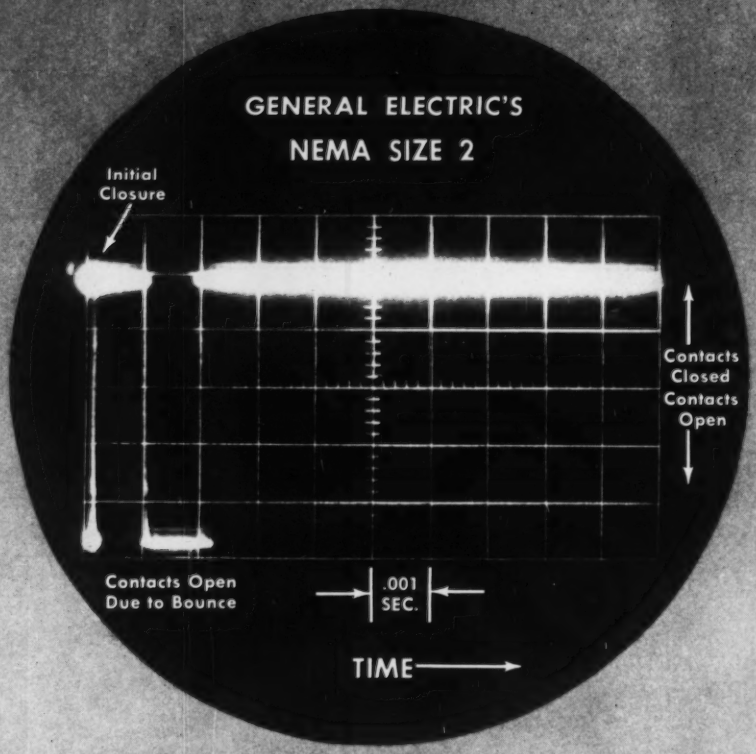
WEIRTON, WEST VIRGINIA

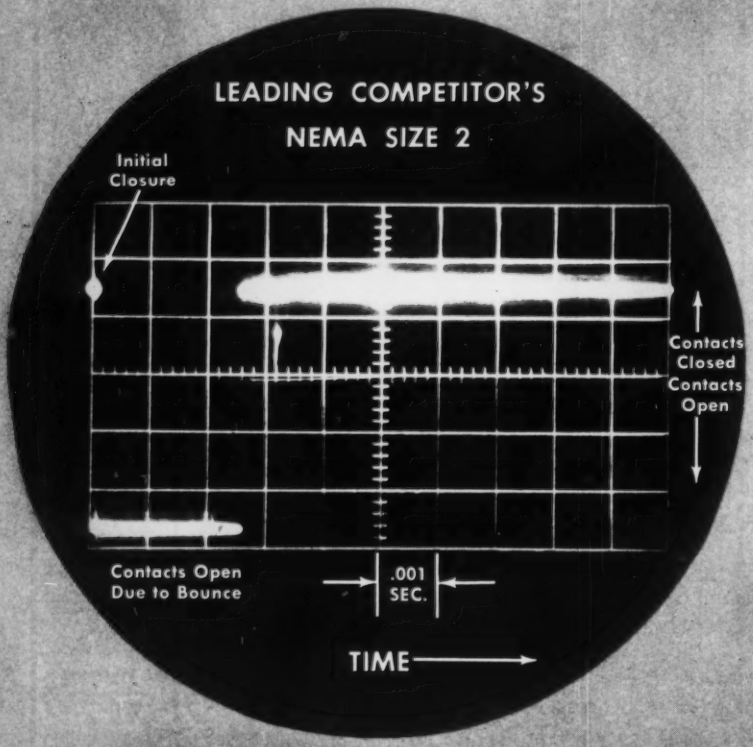
a division of

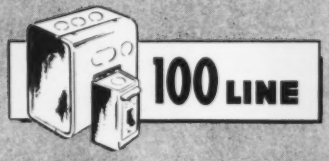
NATIONAL STEEL CORPORATION

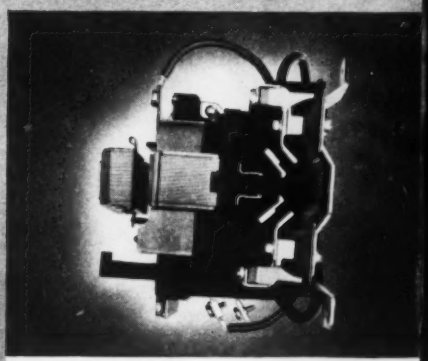
EXCLUSIVE CONTACT DESIGN OF GENERAL ELECTRIC'S 100-LINE

GENERAL ELECTRIC DESIGNS MAGNETIC STARTERS THAT REDUCE CONTACT BOUNCE (THE MAJOR CAUSE OF CONTACT FAILURE)—As shown by these unretouched photographs of cathode ray oscillograms, General Electric's wedge-action contacts achieve rapid, positive "make" with minimum bouncing or arcing. In 20 operations, General Electric's NEMA Size 2 starter (top) recorded an average bounce duration of only .002 seconds before final closure, with a maximum bounce duration of .007 seconds. A leading competitor's NEMA Size 2 starter (bottom) recorded an average bounce duration of .0035 seconds before final closure, with a maximum bounce duration of .0075 seconds. Conclusion: Shorter bounce duration of G-E starters reduces arcing and contact erosion to a minimum.









WEDGE-ACTION CONTACT design of 100-Line General Electric magnetic starters (see cutaway above) gives a virtually bounce-free, positive "make" every time.

MAGNETIC STARTERS (SIZES 0-1-2) MEANS . . .

BETTER PERFORMANCE

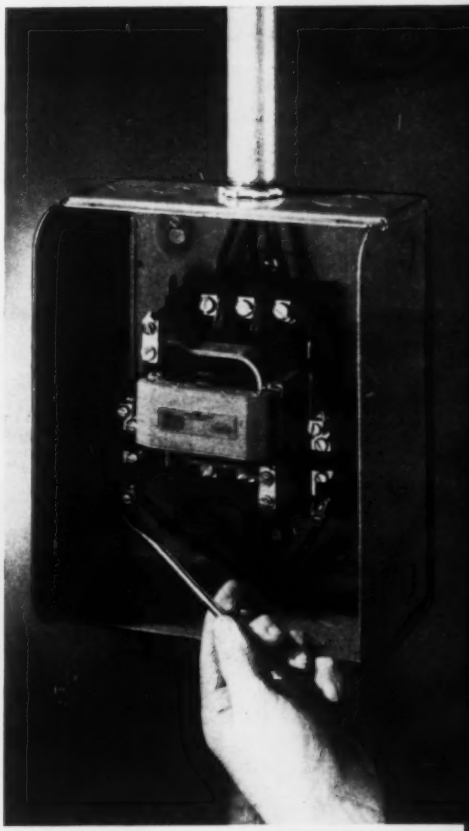
The wedge-action contact design of General Electric's 100-Line magnetic starters provides better performance by virtually eliminating contact bounce—the major cause of contact failure.

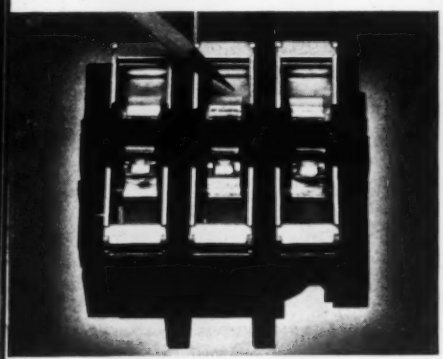
Less bounce and minimum arcing result from G.E.'s starter design because of less armature mass and spring-loaded contacts which absorb the shock of contact. Positive "make" is provided by G-E contacts because the contact arm design enables it to move only forward and back. Lateral contact movement is practically impossible, thus reducing arcing and contact wear, and assuring longer contact life. Positive "break" is provided by contact springs and a low-stress "kick-off" spring in the contact arm.

Also, less contact contamination occurs with G.E.'s 100-Line magnetic starters because vertical slant contact design shrugs off dust and dirt, keeps the starter performing better.

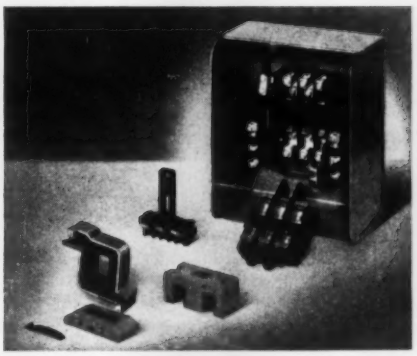
For information on all the other benefits of G.E.'s 100-Line design, contact your nearby G-E Apparatus Sales Office or Distributor, or write to Section 733-46, General Electric Co., Schenectady, N. Y. (Ask for Bulletin GEA-6917.)

GENERAL ELECTRIC



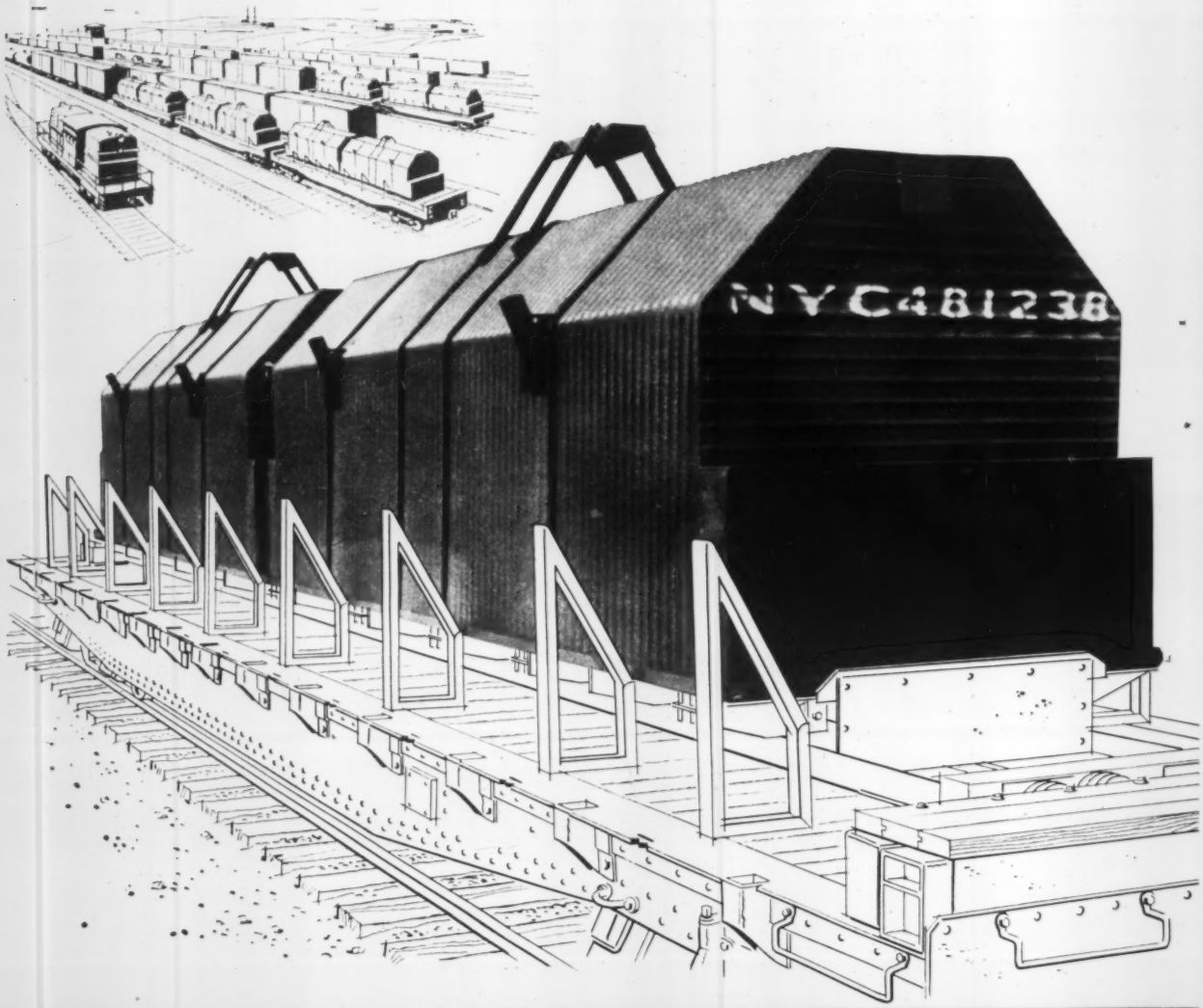


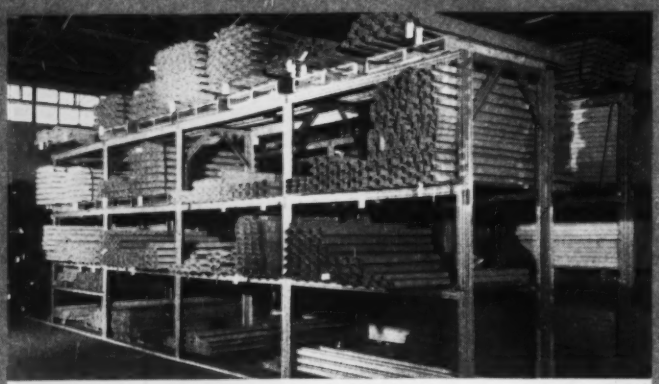
NEW ARC TRAP DESIGN on Size 2 starters releases ionized gases but contains arcs. Arcs are attracted to the magnetic steel *arc trap* which splits and cools them quickly.



SNAP-SLIDE CONSTRUCTION permits complete starter disassembly in 20 seconds, without tools. All operating parts either snap or slide together for maximum accessibility.

STRAIGHT-THROUGH WIRING with line terminals on top and load terminals on bottom saves wiring time. All wiring is done from the front, and no wires need be bent or looped.





REPUBLIC METAL® LUMBER is the answer to erecting fast, economical, framing assemblies. It is as easy to use as common lumber. Yet, stronger . . . because it is heavy gage steel. METAL LUMBER is engineered with a scientifically designed pattern of slots arranged on ¾" centers. Even complicated framing problems are easy because this unique system of short longitudinal and transverse slots make possible an unlimited number of straight and angular combinations. Write today.

REPUBLIC MATERIALS HANDLING EQUIPMENT helps you save time in stack, store, ship operations. They speed materials handling and reduce storage area requirements. Stacking does not damage boxes. Heavy-duty stacking brackets and corrugated box construction deliver long, efficient service at lowest cost.

Republic COIL COVERS

simplify handling . . . protect cargo in transit

Republic Hood Type Coil Covers speed freight handling, protect cargos in transit, stop vandalism.

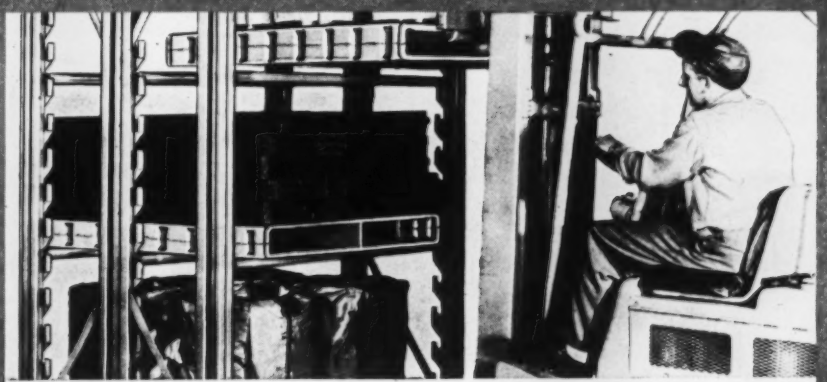
Designed for use on standard gondola and flat cars, Republic Coil Covers are approximately 22 feet long, 6 feet wide, and 6 feet high. Two covers are required for each car.

Republic Coil Covers are constructed of 13-gage sheets with 3/16" reinforcing members. Corrugated steel construction provides added strength, assures long service life at lowest per-year cost. Weight: approximately 2,400 lbs. per cover.

Republic Covers are easily handled by overhead or track-side cranes. Six specially designed stacking brackets permit easy tiering during loading-unloading operations. Design of top grab permits easy handling with a "C" hook—no need for a man to be on the car to engage the lifting device.

Offer your customers the best possible protection. Ship with Republic Coil Covers.

CALL YOUR REPUBLIC REPRESENTATIVE, OR WRITE . . .



SIMPLIFY PALLETIZING AND STACKING, save space with Republic Steel Pallet Racks. The savings of palletized handling now can be applied to bulky, uneven, odd-lot, and fragile materials. Republic Steel Pallet Racks make palletizing practical. Tubular steel supports adjust every six inches to handle palletized material of any height. Select single pallets from any level without restacking. Two-way entry permits loading and unloading from either side. Write today for complete information. A Republic Materials Handling Engineer will be glad to offer you assistance in solving materials handling problems.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL

REPUBLIC STEEL CORPORATION
DEPT. ST-8375
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Please send information on the following Republic Products:
☐ Republic Coil Covers ☐ Republic METAL LUMBER
☐ Materials Handling Equipment ☐ Pallet Racks
☐ Please have a Materials Handling Engineer call

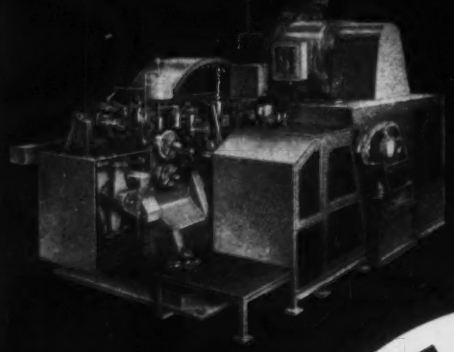
Name_____ Title_____

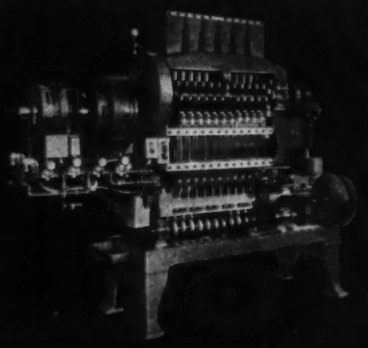
Company_____

Address_____

City_____ Zone_____ State_____

COLD HEADING
MACHINERY

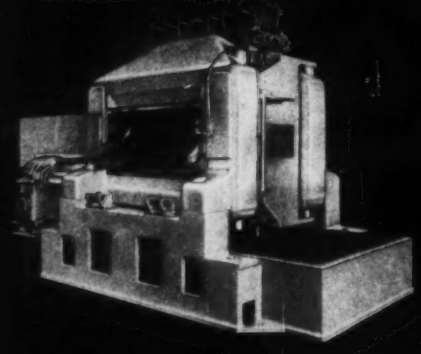


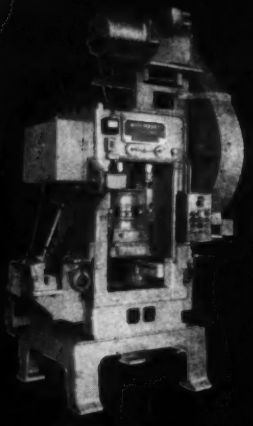


EYELET, SLITTER
& WIRE
MACHINERY

WATERBURY
MACHINERY BUILDERS
FARREL

ROLLING MILL
MACHINERY





POWER
PRESSES

THE WATERBURY FARREL FOUNDRY & MACHINE CO.
DIVISION OF TEXTRON INC.
Waterbury, Connecticut, U.S.A.
Sales Offices: Chicago • Cleveland • Los Angeles • Millburn, N. J.

Chemical energy provides direct current

Power is furnished by a fuel cell in the Allis-Chalmers Research Laboratories. It points the way to remarkably efficient means of energy conversion in the future.

Unlike the conventional storage battery, the fuel cell converts the chemical energy of gases (at room temperature) directly into direct current. For the future the fuel cell promises a highly efficient source of power.

Fundamental research of this type serves *two* end results at Allis-Chalmers: 1) enables design engineers to make equipment even better; 2) helps every industry achieve new efficiencies and economies.

Research is only one area where A-C helps. Single-source availability of "teamed" equipment, maximum engineering assistance and outstanding service facilities are others. For more information, contact your A-C representative, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

Plan to stay ahead... MODERNIZE!

Products for Industry Electrical Generation, Distribution and Utilization Equipment; Pumps; Compressors; Mechanical Power Transmission Equipment; Processing Machinery; Motors and Control; Water Conditioning Systems, plus Materials Handling Equipment.

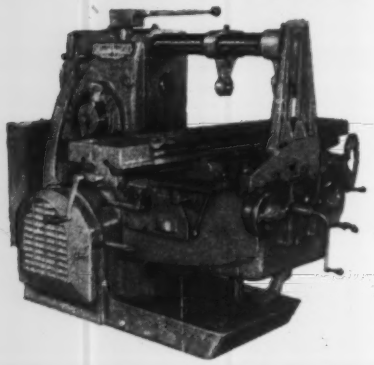
A-C ALLIS-CHALMERS

A-1010-G1

Fuel Cell, being researched by Allis-Chalmers, converts chemical energy of hydrogen, oxygen or other gases into direct current. It operates with minimum maintenance and is unaffected by temperatures.

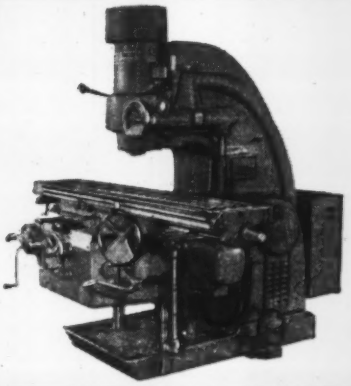
Kearney & Trecker machine tools

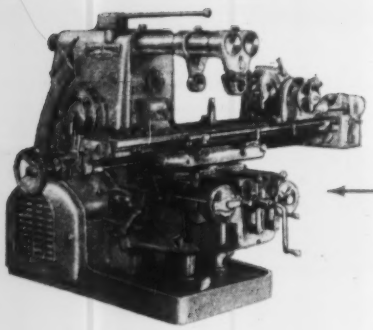
quality...greater economy and



TF Series Line

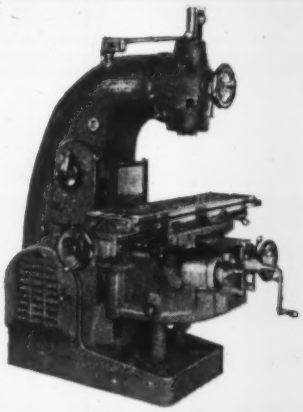
Strikingly new milling machines feature twin screw knee support for greater rigidity; new control center for ease of operation; improved Mono-Lever and Automatic Cycle Table Control; front-mounted backlash eliminator; adjustable saddle clamping gib; three bearing spindle that increases rigidity eight times over spindles without center bearing support, and many other features. TF's are available in five sizes Plain (left), Universal and Vertical (right) styles from 10hp to 50hp. (Catalog No. TF-50)

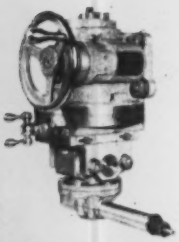




CH & CHL Milling Machines

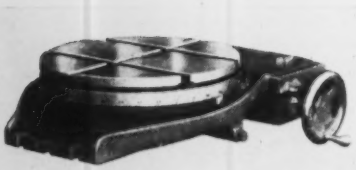
These modern knee type milling machines incorporate the latest design and operating features... greater capacity for power, speeds and feeds. Machines are available in Plain, Universal and Vertical styles.. 3 to 10hp. (Catalog No. CH-3)





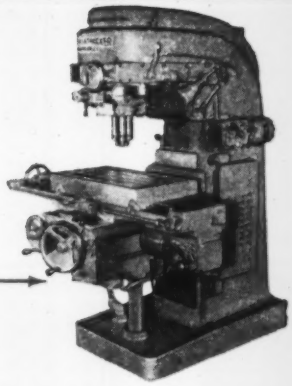
Attachments and Accessories

A complete selection for every milling requirement to convert standard machines into special purpose tools. Provide maximum productivity by supplementing with any of the various Kearney & Trecker standard attachments. Bulletins available on request.



Model 2D Rotary Head

Rotary head motion, combined with milling machine's ability to do boring, slotting, drilling, vertical milling, circular and angular milling, transmits complete blueprint into metal without changing setup. Speed range 250 to 4000 rpm; feed range .0002 to .008 ipr; rotary head feed range (16 changes) 2 to 3 rpm. (Catalog No. D-20)



TOOL-LEASE

Should you desire, you can conserve capital, reduce obsolescence using Kearney & Trecker's Tool Lease program. You can choose the machines you need from nearly 350 different standard milling and precision boring machines.

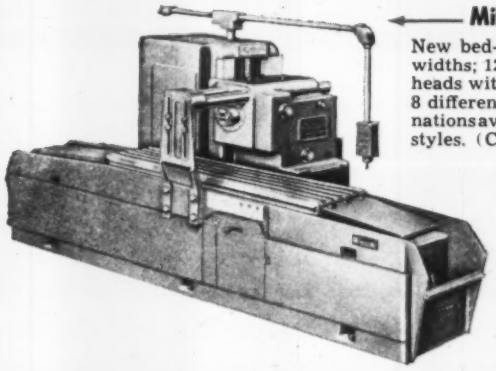
Designers and Builders of Precision and Production

offer you more productivity and performance than ever before...

TODAY, Kearney & Trecker gives you several complete new lines of knee and bed type milling machines, precision boring machines and special production machines to meet growing metalworking needs.

Note the *exclusive* twin-screw support of the massive knee and saddle on the new TF Series milling machines... the compact, central control grouping... profit-making features typical of the advanced design you'll find on every machine shown.

For complete information on these new machines, see our nearest representative. Ask for catalogs listed here, or write Dept. S - 99, Kearney & Trecker Corp., Milwaukee 14, Wis.

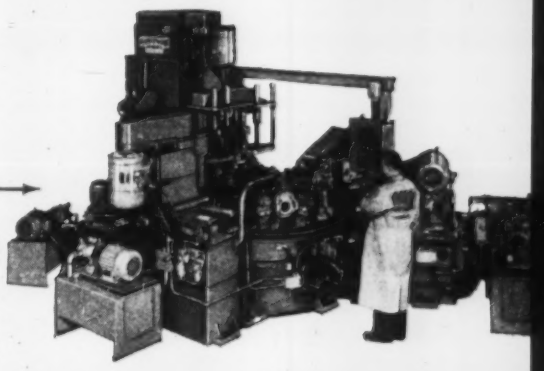


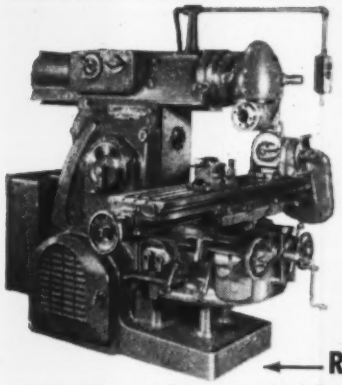
Mil-waukee-Mil Series

New bed-type design features: 4 table widths; 12 table sizes; 3 sizes of spindle heads with 3 speed ranges in each size; 8 different hp ratings. Over 300 combinations available in Simplex and Duplex styles. (Catalog No. MM-55)

Special Rotary Indexing and Transfer Machines

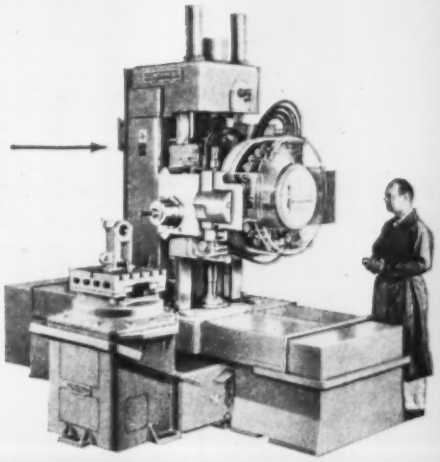
This 5-station rotary indexing machine features standard units: feed slides, quill feed, drill power units and rotary index table. Other special machines available. (Catalog No. SMD-10 and Data Sheet 1076)





Numerically controlled MILWAUKEE-MATIC

This single unit, tape-controlled machining center, unifies three basic processes — milling, drilling and boring. It is flexible automation of simple and complex machining operations on small- and medium-size lot production. Thirty-one tools are changed automatically on this new tape-controlled production machine. (Catalog No. TG-58)



Ram Head Milling Machines

Machine combines standard horizontal spindle with separate motor-driven vertical spindle mounted on sliding Ram. Ram may be equipped with either Universal, Vertical or Quill type head. Machines available in No. 2 to No. 4 sizes, Plain and Universal styles (Catalog No. RH-10)

Machine Tools Since 1898

KEARNEY & TRECKER MILWAUKEE

BETTER METAL CLEANING *with Du Pont "Triclene" D*

Here's why value-conscious buyers choose Triclene® D over TRICHLORETHYLENE all other degreasing solvents

They rate a solvent in terms of lowest total cleaning cost, rather than by material costs alone. Here's how "Triclene" D can cut your total cleaning costs:

Quality Product—Many claim quality, but few can demonstrate it with actual dollar savings. "Triclene" D can save you dollars . . . consistently and under all types of operating conditions. It's the "standard of the industry"—the one solvent you can use to assure continuous, trouble-free operation.

> **EXAMPLE:** *A padlock manufacturer who had sludging problems changed over to stabilized "Triclene" D. He eliminated costly hand wiping and operated 50-75% longer between degreaser cleanouts.* TOTAL CLEANING COST SAVING: *$6,400, or 3.2¢ on every pound of "Triclene" D purchased by this firm each year.*

Du Pont Technical Service—This means complete and expert assistance in solving metal cleaning problems. As one buyer put it: "Du Pont service helps me meet our quality-control standards and keeps my degreasing costs at the lowest possible level." You can add this experience to your own—at no extra cost—any time you need it.

> **EXAMPLE:** *A lawn mower manufacturer (see opposite page) followed the suggestions of a Du Pont representative and cut solvent costs 72% on one degreaser.* TOTAL CLEANING COST SAVING: *$8,000, or 6.4¢ on every pound of "Triclene" D consumed during a year.*

New Finishing Methods—Dollar-conscious buyers have learned from experience that Du Pont's many new metal finishing advances mean greater process safety. And the savings are so substantial that it would take years to equal them via "price buying". In the months ahead many plants will be benefiting from a new Du Pont process—Integrated Cleaning and Painting—which combines vapor degreasing and non-flammable painting in one compact unit.

> **EXAMPLE:** *An analysis made for one large midwestern manufacturer showed that Du Pont's Integrated Cleaning and Painting Process will save 27% of his present cleaning and painting cost. When installed, these new facilities will save over $40,000 annually, or 13.6¢ on every pound of trichlorethylene used for vapor degreasing—or, to put it another way, his trichlorethylene requirements will cost him nothing!*

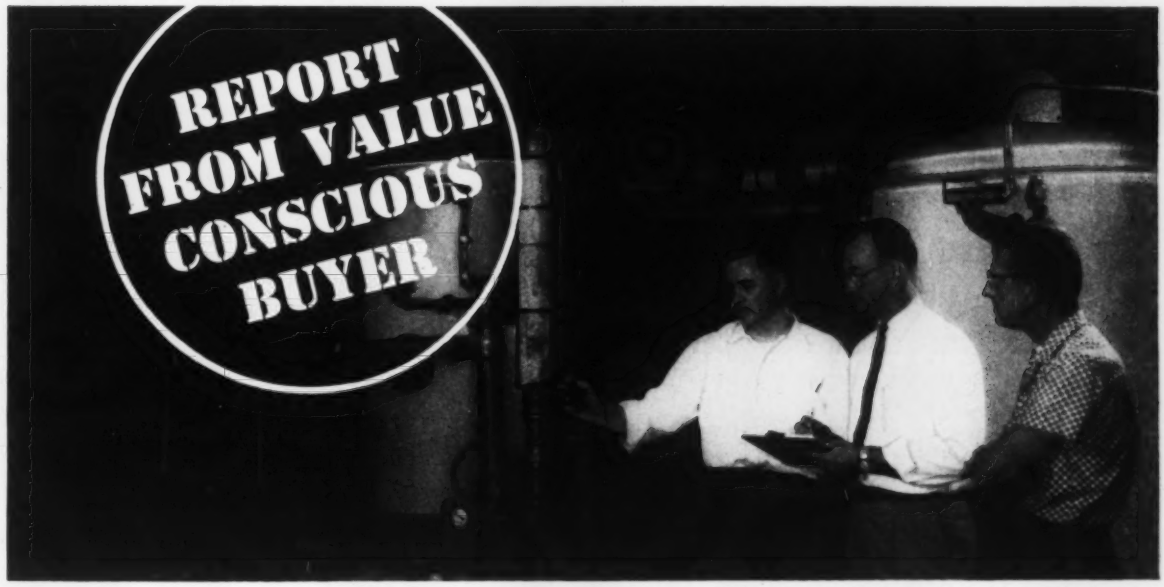
Exclusive Metal Cleaning Cost-Analysis Methods—Here is a proven way to arrive at the true cost of metal cleaning. A Du Pont cost analysis (see opposite page) can give you an accurate and complete cost of your present cleaning operation . . . or a comparison of competitive cleaning methods handling the same job. It has already resulted in cost reductions for hundreds of companies.

> **EXAMPLE:** *Basing his decision on a Du Pont cost analysis, one western manufacturer changed degreasers . . . and doubled efficiency.* TOTAL COST SAVING: *$5,500 annually, or 2.75¢ on every pound of "Triclene" D used by this manufacturer.*

Experienced Distributors—Local men with an interest in you and your company. These men know the metal cleaning field and can help you with your problems. Fast and efficient service when you need it.

> **EXAMPLE:** *An aircraft company placed a last-minute order for a large quantity of "Triclene" D with their local distributor. Extensive stocks permitted the Du Pont distributor to deliver a day earlier than the next best source. This ability to serve enabled the customer to avoid incurring immeasurable costs resulting from equipment downtime and production delay.*

Cut costs by dollars—not pennies! Order "Triclene" D and profit from all the money-saving services above—available *only* from Du Pont and its distributors.



• Donald Jackson, YARD-MAN general foreman, Robert Baxter, Du Pont technical representative, and Carl Heideman, YARD-MAN maintenance foreman, check Vapor Spray Vapor double monorail degreaser.

How Du Pont service helped Yard-Man, Inc., save $8,000 on one degreaser alone!

"A cost analysis shows that solvent costs were cut 72%. And by using Du Pont "Triclene" D trichlorethylene, we get a superior cleaning job"

Says Ed Krenkel (Plant Supt. of Yard-Man, Inc., Jackson, Mich.)

During a regular call on YARD-MAN, INC., a Du Pont representative suggested improvements that could be made on one of their large degreasers cleaning 5 to 7 tons of lawnmower parts a day. With his recommendations and help the YARD-MAN production and maintenance staff modified the degreaser design and corrected several operating procedures.

Results: Solvent consumption was cut 72% on this one degreaser. Operating costs—as revealed by a Du Pont cost analysis*—were cut $4 per hour—an annual saving of $8,000! YARD-MAN cut over-all cleaning costs by 30% in spite of a 50% increase in total degreasing throughput. Thorough cleaning, made possible with "Triclene" D, has resulted in a drastic reduction of "pre-paint" rejects. Now, YARD-MAN benefits from a smoother and faster flow of work through the plant.

The results at YARD-MAN prove a point familiar to most value-conscious buyers—that Du Pont service and "Triclene" D are an unbeatable combination that makes their degreasing dollar *worth more.* (See full story on advantages of buying "Triclene" D—at left.)

You can profit as YARD-MAN has. Talk with a Du Pont representative or a Du Pont distributor of "Triclene" D trichlorethylene. He can use the full range of Du Pont services to help you get a thorough and economical cleaning job. Write to the address below.

*Another exclusive Du Pont service. See below.

A DU PONT "HIGH SPOT" COST ANALYSIS CAN HELP YOU CUT CLEANING COSTS

A Du Pont "High Spot" cost analysis will show you exactly what and where your complete cleaning costs are. It can provide you with reliable figures for each one of your many—and often hidden—metal cleaning costs; and help you make a side-by-side comparison of competitive cleaning methods handling the same job . . . in one hour or less.

The figures of a "High Spot" cost analysis can frequently show you ways to trim out-of-line costs, or select the most efficient operation if you're expanding. Let Du Pont run a "High Spot" cost analysis in your plant . . . it may point the way to large cost savings. Call your Du Pont representative or write address below.

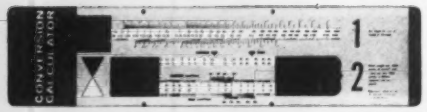
TRICLENE® D

TRICHLORETHYLENE

ELECTROCHEMICALS DEPARTMENT, CHLORINE PRODUCTS DIVISION
E. I. DU PONT DE NEMOURS & CO. (INC.), WILMINGTON 98, DELAWARE

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY



NEW! ANOTHER BIG BONUS IN ALCOA SCREW MACHINE STOCK

With the exclusive new Alcoa Conversion Calculator, it's a snap to find total costs and resulting per cent savings in switching to aluminum screw machine stock . . . in just three minutes or less. This handy slide-rule calculator does all the mathematical computations! Just set the part length at the stock size and read out the pounds of brass and aluminum per 1,000 pieces . . . with *automatic allowance* for 5 per cent operating scrap, 3 per cent bar end loss and 0.103-in. cutoff and facing loss. Then, determine your local material costs and—zip!—you've got the gross rod or bar costs for both metals. The reverse side of the calculator gives you an equally fast answer for the percentage savings when you switch to Alcoa® Aluminum.

Call your Alcoa sales office or Alcoa distributor today for an Alcoa Conversion Calculator. You'll find them listed in the Yellow Pages of your telephone directory under "Aluminum."

Your Guide to the Best in Aluminum Value

For exciting drama watch "Alcoa Presents" every Tuesday, ABC-TV, and the Emmy Award winning "Alcoa Theatre" alternate Mondays, NBC-TV

ALCOA ALUMINUM

And don't forget those many additional bonuses when you deal with Alcoa:

- Alcoa Aluminum Screw Machine Stock allows up to four times-higher cutting speeds than other materials—up to 1,000 sfpm speeds.
- Wider range of sizes in standard stock for important price advantages.
- Stock in specific 12-ft lengths at no extra cost . . . in rounds to 2⅞ in. and hexagons to 2 in. across flats.
- Chamfered ends at no extra cost in a wide range of sizes and alloys.
- A guaranteed market for up to 60 per cent of your turnings and borings from four aluminum alloys.
- An extensive mill inventory to back up the nationwide distributor stocks and cover emergency requirements of mill customers.

Alcoa Aluminum Screw Machine Stock Alloys:

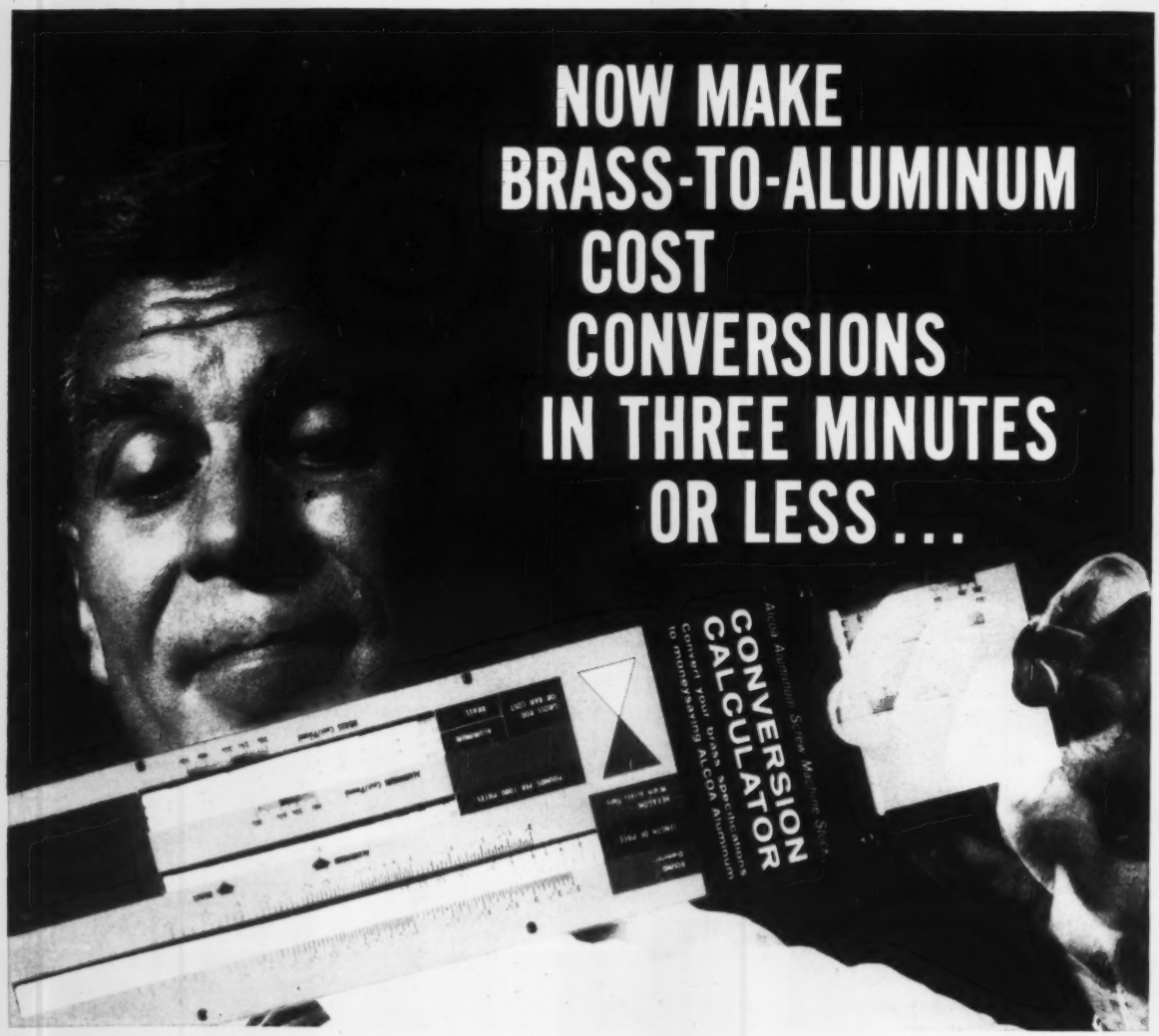
2011-T3: Tops in machinability. Frequently exceeds turning speeds of free-machining brass.

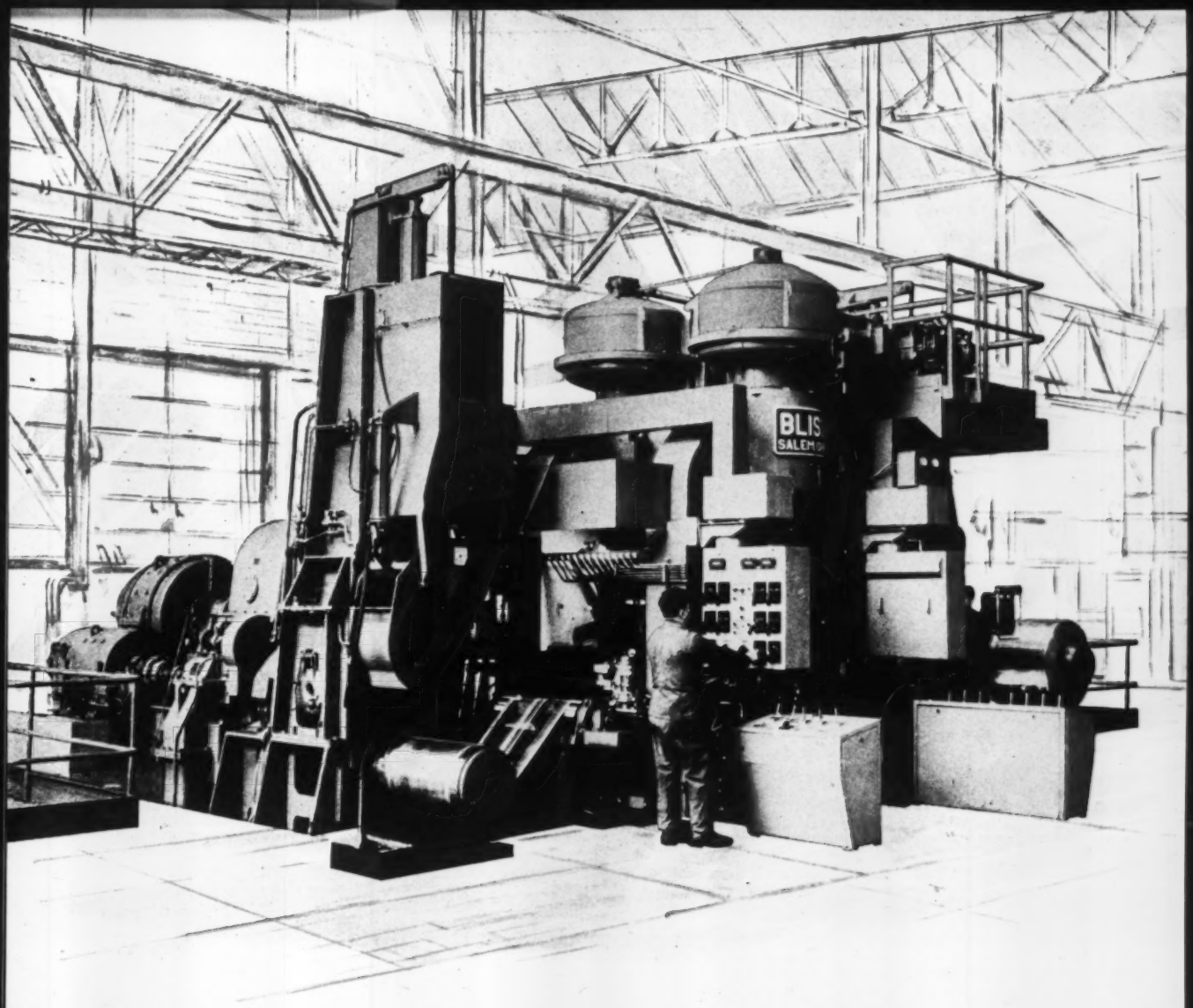
2011-T8: Designed for deep drilling operations. Maintains close tolerances.

2017-T4: One of the strongest alloys used for machine work. Chips readily controlled.

2024-T4: Exceptionally high strength. Cuts at high speeds and feeds for higher production rates.

6061-T6: Excellent finishes possible. Resists corrosion.





New Bliss reversing cold mill for France's largest producer of brass strip

Near Paris, Compagnie Française des Métaux, France's largest producer of brass strip, rolls brass on its new Bliss 6½″ & 30″ x 36″ four-high reversing cold mill.

The mill, which can attain a speed of 1,000 fpm is equipped with the auxiliaries necessary to produce brass strip of the highest quality, in widths up to 30″ and thicknesses as fine as .0028″.

The brass thus produced is used throughout French industry... for automobiles... for defense... for hard goods... for jewelry... for the myriad needs of free Europe.

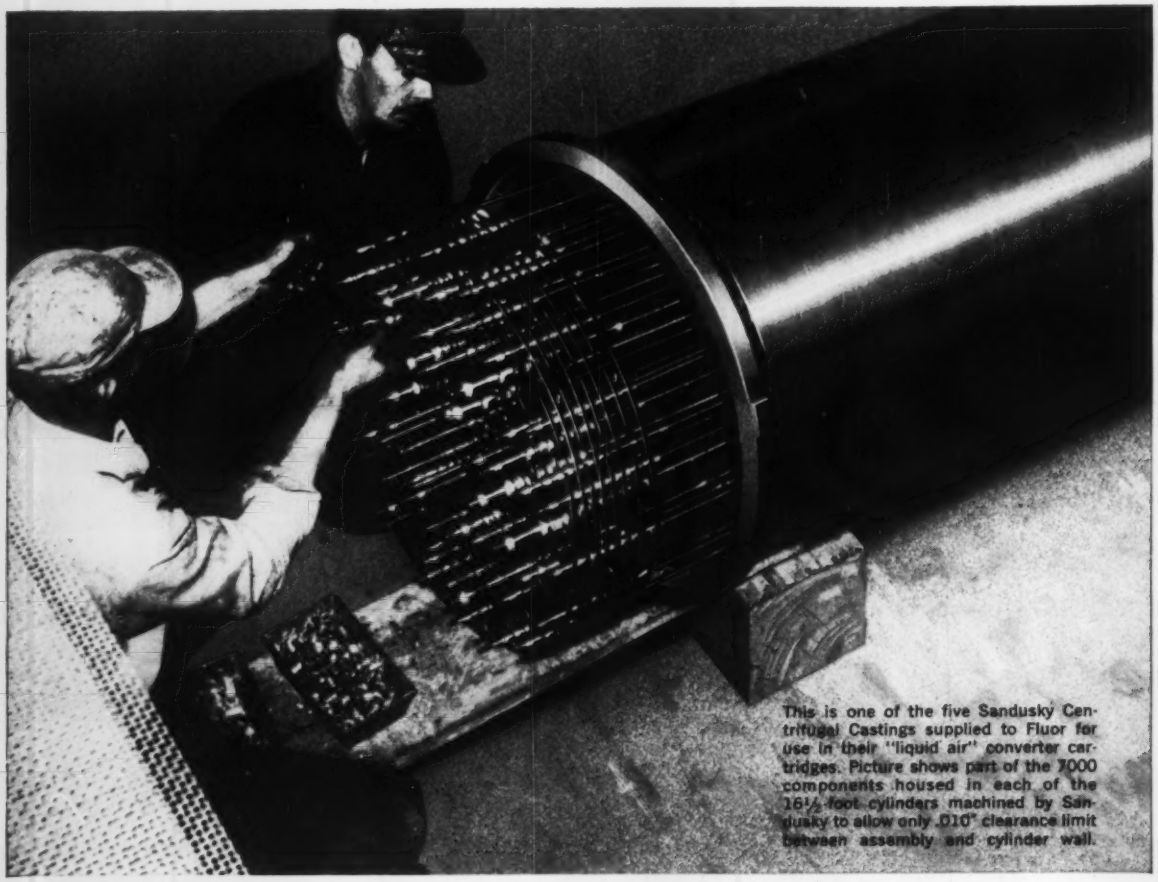
The Paris installation of Compagnie Française des Métaux is the latest of many such Bliss mills being operated throughout the world, rolling all kinds of ferrous and non-ferrous material. To learn of other Bliss-engineered installations, write for a copy of our 84-page Rolling Mill Brochure, Catalog 40-B.

BLISS
SINCE 1857

Bliss is more than a name . . . it's a guarantee

E. W. BLISS COMPANY, Rolling Mill Division, Salem, Ohio

Subsidiary: The Matteson Equipment Company, Inc., Poland, Ohio



This is one of the five Sandusky Centrifugal Castings supplied to Fluor for use in their "liquid air" converter cartridges. Picture shows part of the 7000 components housed in each of the 16½ foot cylinders machined by Sandusky to allow only .010" clearance limit between assembly and cylinder wall.

SOLVED by Sandusky Centrifugal Castings:

This difficult precision-cost-delivery problem for the FLUOR PRODUCTS COMPANY.

Sandusky Quality Centrifugal Castings

Types: Rolls, Sleeves, Rings, Bearings, Bushings, Liners, Bands, Drums, Cylinders, Tubes, Shells, Retorts, Pressure Vessels, Pressure Piping

Sizes: From 7" to 54" O.D.—Lengths up to 33 feet

Materials: Stainless, Carbon and Low-Alloy Steels; full range of Copper-Base and Nickel-Base Alloys

Dimensional stability of Sandusky Centrifugal Castings enabled the Fluor Products Company to fit more than 7,000 precision parts into each of 5 identical cylinders supplied by Sandusky for use as ammonia synthesis converter cartridges.

Centrifugally cast of a modified CF8 (Type 304L) stainless steel, each cylinder was machined to finish dimensions 27¾" O.D., 26⅝" I.D., 199" long. The bore, surface finished to 35 micro inches, was held to .005" maximum out-of-roundness and .008" maximum taper.

What is more important, to meet Fluor's difficult assembly problems these large cylinders would have to be able to retain these carefully machined dimensions.

"The Fluor Products Company Engineers selected Sandusky Centrifugal Castings because of the stringent specifications, critical delivery requirements and competitive cost of this project. This was the first experience with such centrifugally cast products by the Fluor Products Company; and, the Sandusky Foundry and Machine Company people assisted in making this an extremely satisfactory and profitable project."

While you may have entirely different cylindrical design requirements, Sandusky Centrifugal Castings may well provide a similar cost-cutting answer. We would be pleased to have your inquiries.

SANDUSKY (S) *CENTRIFUGAL CASTINGS*

FOUNDRY & MACHINE CO.

SANDUSKY, OHIO Stainless, Carbon, Low Alloy Steels—Full Range Copper-Base, Nickel-Base Alloys

BLAW-KNOX

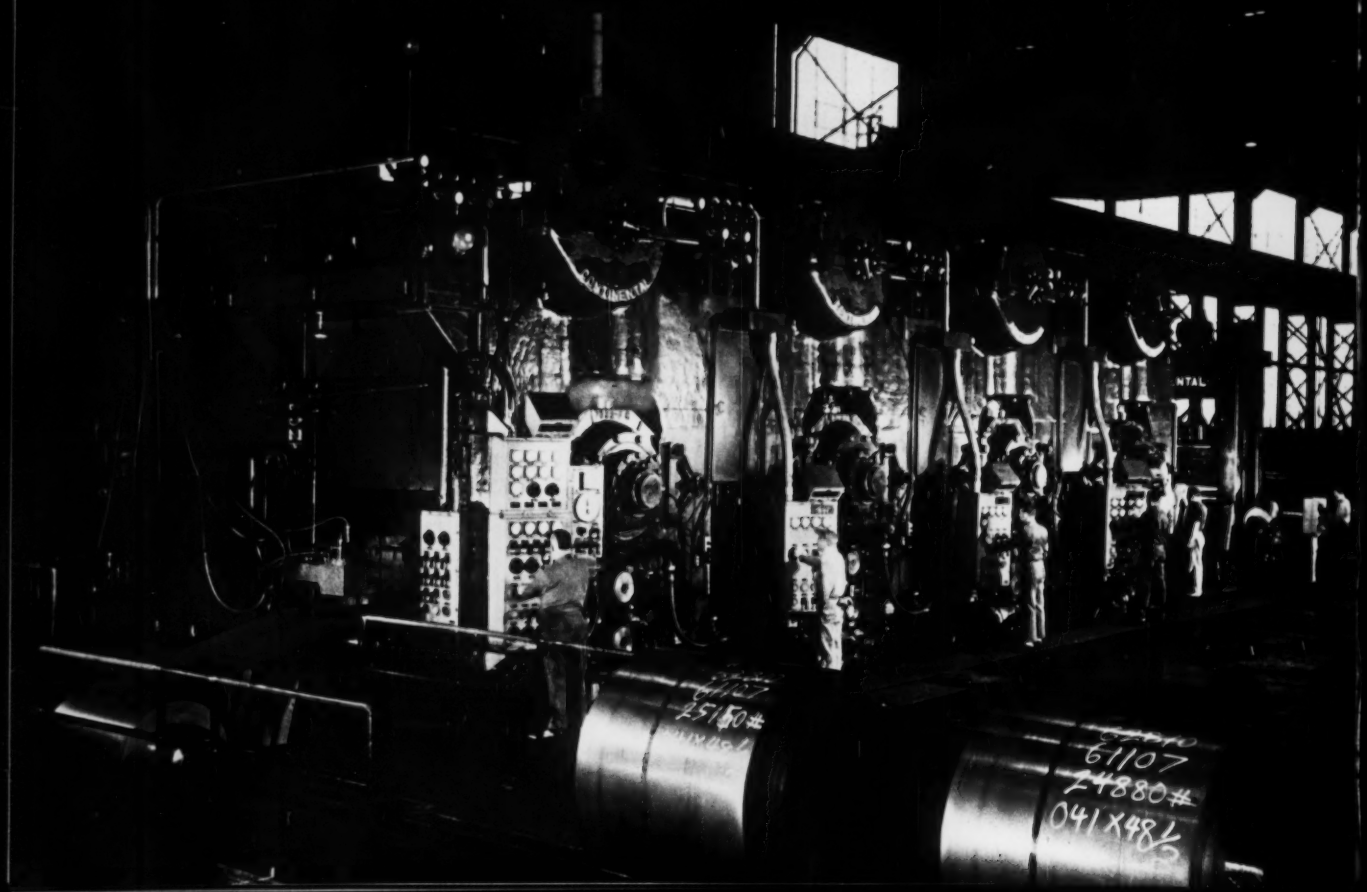
engineered production equipment for the Steel Industry

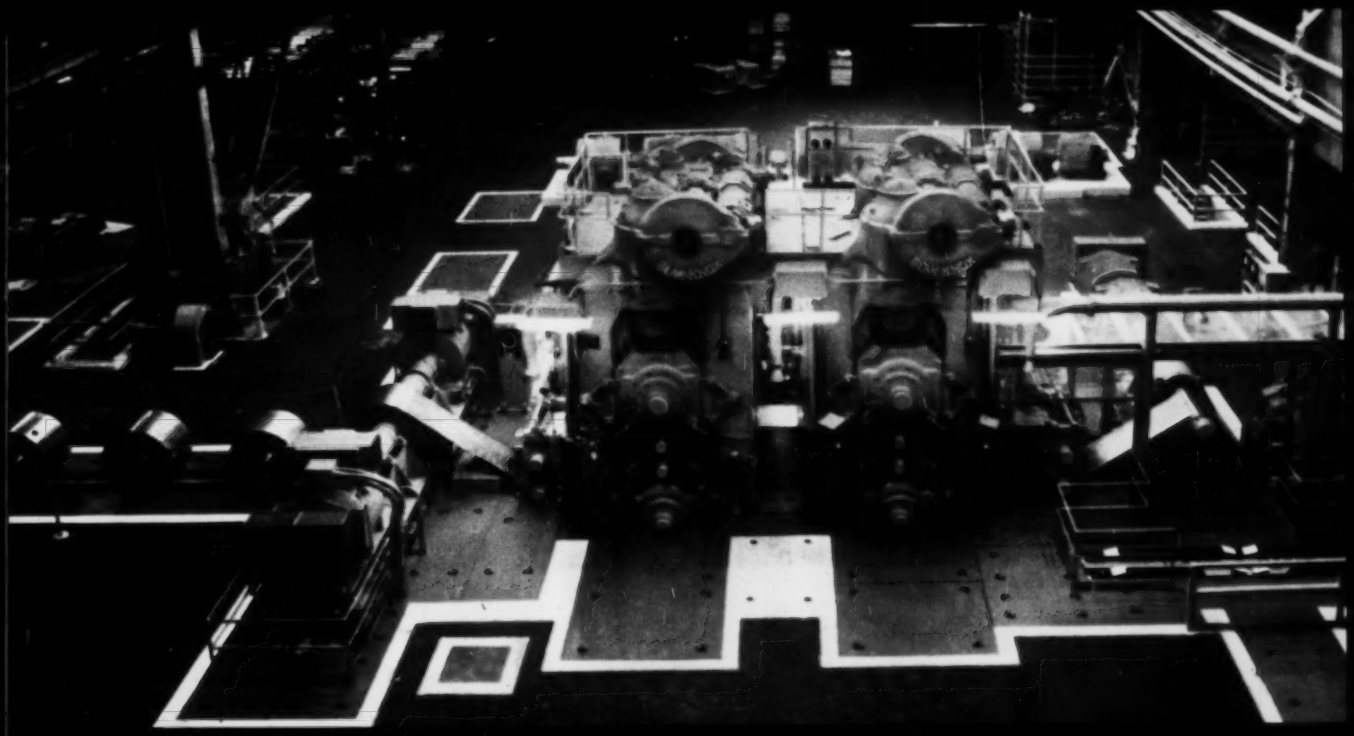
Blaw-Knox offers a complete service for the design, manufacture, and construction of steel rolling, processing, and finishing plants. In addition to these major installations, Blaw-Knox furnishes steel plants with a wide variety of products for use in operations ranging from iron making to cold finishing. The engineering force and plant capacity behind these specialized services and products are unsurpassed in the industry. They will continue to give exceptional service to the steel industry to help meet its constantly increasing production requirements.
Blaw-Knox Company • Blaw-Knox Building • 300 Sixth Avenue • Pittsburgh 22, Penna.

46- x 90-inch Universal Slabbing Mill

56-inch semi-continuous Hot Strip Mill

60-inch 4 stand tandem Cold Strip Mill

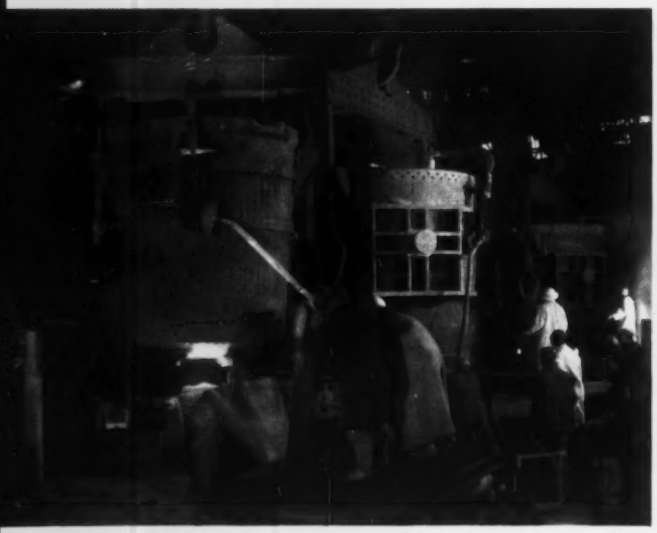




19- and 53-inch x 48-inch 2 stand Temper Mill

Aetna-Standard Continuous Annealing Line

Blaw-Knox Medart Tube Turner uses carbide tools for finishing heavy walled tubing from 9 to 26 inches in diameter.

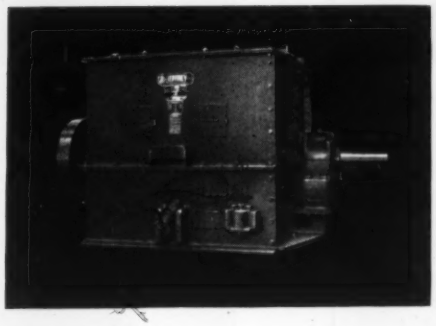


Blaw-Knox Iron and Steel Foundries furnish Iron, Alloy Iron, and Steel Rolls, Carbon and Alloy Steel Castings, and heat and corrosion-resisting Alloy Castings.

Typical of Blaw-Knox mechanized Steel Plant Accessories is the Autopour® which makes possible safe, automatic teeming of ingots from remote locations on the pouring platform.

BLAW-KNOX

Jeffrey Pulverizer crushes fluxstone fine for efficient sintering



The Jeffrey Type B Pulverizer has many advantages in crushing fluxstone for sintering operations. It crushes *fine* – standard 3/8", or 1/8", when required. This is possible since the material goes through several changes in direction and several hammer contacts before it reaches the screen bars.

This unit is reversible, designed for heavy duty work, is dust-tight, and has hydraulic adjustments. Power requirements are less than with other units, since most of the work on the material is done before the material reaches the screen bars.

Fluxstone is but one of hundreds of materials which can be efficiently reduced with Jeffrey Crushers... from alum and asbestos to rock and slag. For complete information check your nearest Jeffrey sales engineer. The Jeffrey Manufacturing Company, 889 North Fourth Street, Columbus 16, Ohio.

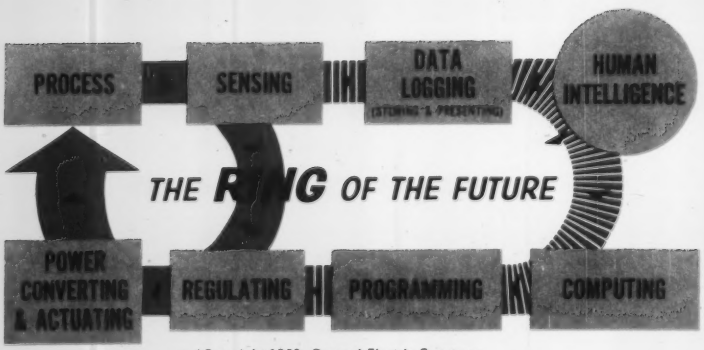
JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT... TRANSMISSION MACHINERY...CONTRACT MANUFACTURING

General Electric can help you . . .

MODERNIZE FOR PROFITS ...through automation

GENERAL ELECTRIC'S "RING OF THE FUTURE" CONCEPT



*Copyright 1958, General Electric Company

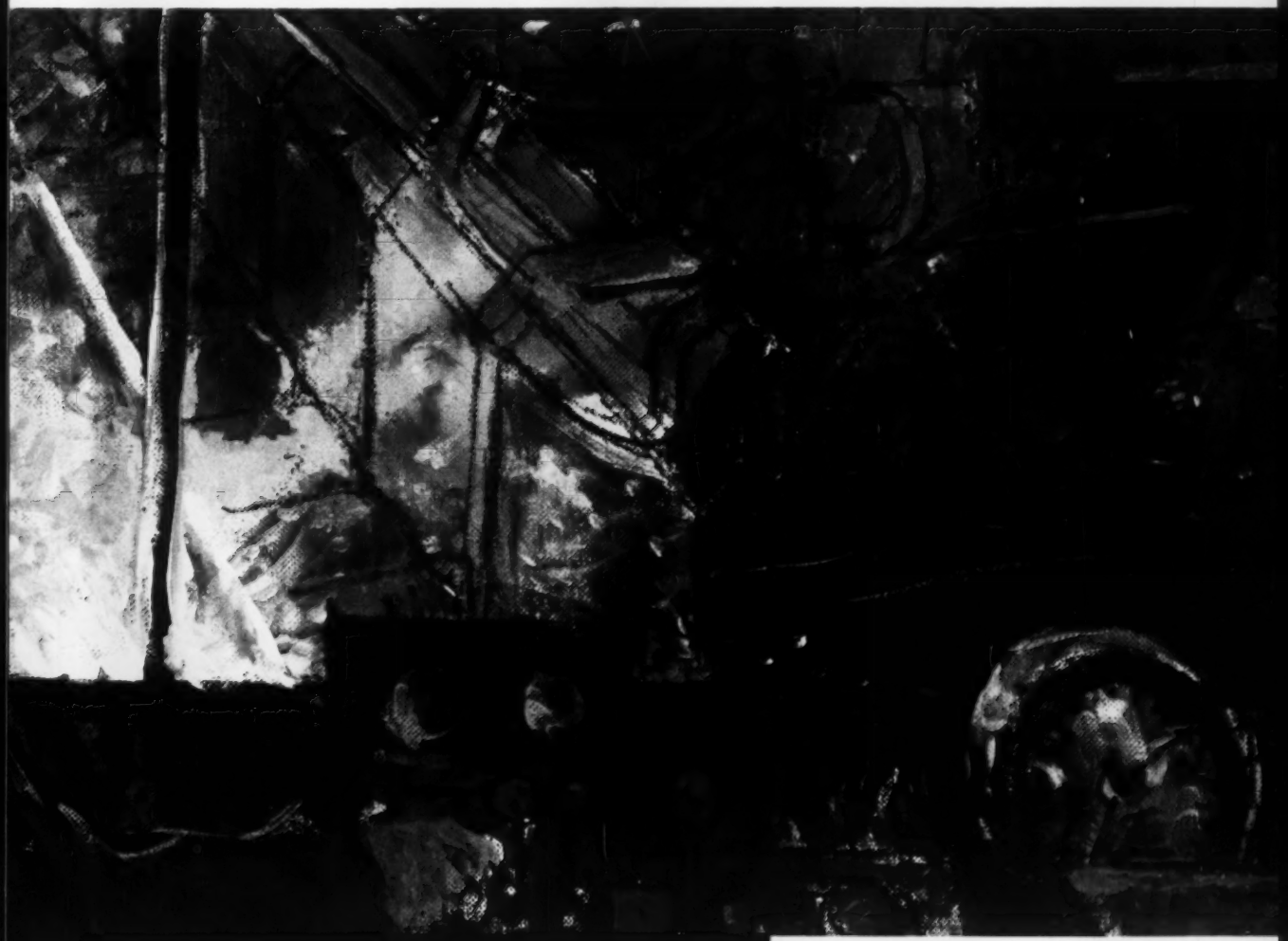
"THE RING OF THE FUTURE" . . .

. . . General Electric's approach to automation, helps you blend the products of today into the systems of tomorrow . . . provides a logical, step-by-step approach to modernization through automation. Start your program now. Call your General Electric Apparatus Sales Office for complete information about the "Ring of the Future" and how it can be applied to:

- **REVERSING HOT MILL PROCESSES**
- **HOT STRIP MILL PROCESSES**
- **CONTINUOUS MILL PROCESSES**
- **PROCESS LINE OPERATIONS**

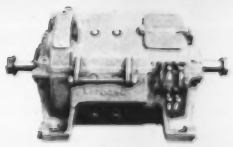
You can meet your competitive challenge decisively with a planned program of modernization . . . modernization that provides greater machine flexibility, higher efficiency and output from your metal rolling and processing systems. General Electric stands ready to assist you in blending the products of today into the systems of tomorrow. To learn more about modernization through automation, mail the coupon below for General Electric's "Ring of the Future"* kit.

For a 13" x 29" lithograph copy of this painting suitable for framing, write on your letterhead to address below.

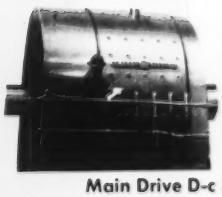


CAN HELP YOU MODERNIZE FOR PROFITS

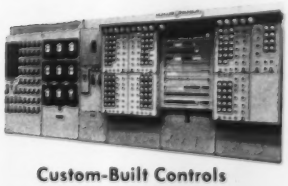
Computers



MD-600 Armored Motors



Main Drive D-c Motors



Custom-Built Controls

TO: SECTION 823-1,
GENERAL ELECTRIC COMPANY,
SCHENECTADY 5, NEW YORK

.....Please send me G.E.'s "Ring of the Future" kit.

Name.....

Position..... Company.....

Address.....

City..... State.....

Progress Is Our Most Important Product

GENERAL ELECTRIC

Tuffy Tips —on safe use of Slings and Hoist Lines

Safety in Hoisting Saves Costly Injuries

During a recent 12-months' period lost-time back injuries reported in one state (California) totaled 32,643. Lost-time injuries caused by strain or over-exertion: 24,639. A high price to pay—in misery and money—for lifting, pushing or carrying loads. Medical aid and compensation costs of materials handling accidents run far into the millions every year. Proper hoisting equipment, properly used and maintained, is one important answer to this problem. It may save your workers disabling injury, and save you expensive absenteeism and lost production.

Rules for Safe Use of Hoists

1. **DON'T LET MUSCLES** do what a proper size hoist should do.

2. **SMALL HOISTS** aren't expensive. With proper slings and hoist lines, they will help greatly in reducing injuries to workers.

3. **USE THE RIGHT SLING AND HOIST LINE** for the job. Tuffy Slings and Hoist lines are "tailored" to every need, from the smallest block and tackle to giant cranes and other equipment.

4. **DON'T ASSUME** that all slings are right for all kinds of lifting. Your Tuffy distributor will help you select the right ones.

Kinks Are No Hazard with Tuffy Slings

One of the first rules of safety: never use a *wire rope* sling that has been kinked. Not so with Tuffy Slings. Tuffy's patented, 9-part machine-braided fabric is just about impossible to kink. And if it should, it's easy to straighten out the kink, leaving no material damage.

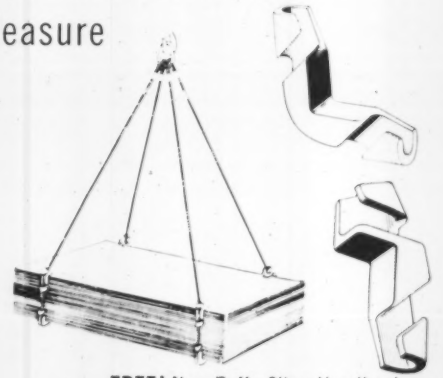
Unique Ferrule Gives the Eye Splice Full Fabric Strength

The steel ferrule is slipped over the tuck-splice of the sling eye and pressed on under tremendous pressure. It gives the eye splice 100% of fabric strength. No abrupt edges or rough projections to injure hands and slow down work. And there's no extra cost for this extra efficiency and safety feature!

Proper Fittings Are An Important Safety Measure

Fittings used on Tuffy Slings are designed for a broad and varied range of needs. Your Tuffy distributor, or Union Wire Rope engineers, will be glad to advise you on the correct fittings for greatest service and safety for any wire rope rigging.

Shown here are Newco Sling Saddles, fittings that are widely used to protect loads and lengthen the life of slings. These saddles are made in two types: Type B and Type T. Both are shown in the illustration. Type T is used at the top of the load; type B at the bottom. They can be changed quickly from one sling to another. They eliminate the strand cutting that occurs around 90° edges and protect the load. Full data on dimensions and weights for Newco Sling Saddles—and the full line of sling fittings—are included in the Tuffy Sling Handbook that's yours for the asking (see below).



FREE! New Tuffy Sling Handbook

Revised, enlarged edition. Covers slings and sling fittings from A to Z. Gives types, dimensions, weights and rated loads. Send for your copy now. Address **Union Wire Rope Corporation, 2160 Manchester Ave., Kansas City, Mo.** Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand.

Use Tuffy Hoist Line for Greatest Economy and Safety

Tuffy Hoist Line and Tuffy Slings are the ideal team for efficient hoisting at lowest cost per ton-mile. The extra strength, toughness and service life we build into the Tuffys cost you nothing extra.

Your Tuffy Distributor Offers the Most in Service and Savings

UNION Wire Rope

ARMCO

Subsidiary of ARMCO STEEL CORPORATION

OTHER SUBSIDIARIES AND DIVISIONS: Armco Division • Sheffield Division • The National Supply Company
Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Southwest Steel Products

New steels are born at Armco

S-5

Big Paul digs and dumps 105 tons in 50 seconds!

"T-1" and TRI-TEN Steels cut dead weight—boost strength

Even from a 100-foot-high perch, the mammoth size of the bucket of Big Paul, the King of Spades, is hard to comprehend.

There are three of these 70-yard giants—all built by Marion Power Shovel Company. All achieve strength and toughness with least weight by the use of USS "T-1" Constructional Alloy Steel and USS TRI-TEN High-Strength Low-Alloy Steel.

Big Paul sets the pace at the Peabody Coal Company's River King mine near Freeburg, Illinois. It rams through rock and shale to uncover some two million tons of coal per year.

Since 1950, the art of big shovel making has increased dipper size from 35 to 45, 55, 60, and now 70 cubic yards per bite. Most of the buckets and dipper sticks of these giant shovels are made of USS "T-1" Steel, for otherwise, it would be almost impossible to make them light enough and tough enough. They hold up in this service, taking terrific impact abrasion and shock loading, even in the dead of winter. This is possible because USS "T-1" Steel retains its toughness at temperatures far below zero.

Dipper Size Increased 25%

USS "T-1" Steel has often enabled a boost in the capacity of original equipment without increasing weight. For example, a 20-yard bucket was replaced with a 24-yard "T-1" Steel job. Other dippers were boosted from 26 yards to 32, and 36 yards to 45—increases of 25%.

Many other parts—dipper stick, bail handles and crowd rack—are built stronger and lighter with this 90,000 psi minimum yield strength constructional alloy steel. (USS "T-1" Steel plates up to 2½ inches thick inclusive are *now* available with a minimum yield strength of 100,000 psi.)

The booms and A-frames of most shovels over 45 yards are designed with high-strength low-alloy steels with 50,000 minimum yield point . . . usually USS TRI-TEN Steel.

Perhaps you need a steel that offers higher yield strength, extraordinary toughness and resistance to impact abrasion, combined with relative ease of fabrication. USS "T-1" Steel is your answer, and we'll gladly help you adapt it to your application. For free booklet, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS, "T-1" and TRI-TEN are registered trademarks

◀ 70-yard dipper and handle, crowd rack, bail and sheave blocks—all built stronger and lighter with USS "T-1" Steel.

United States Steel Corporation – Pittsburgh
Columbia-Geneva Steel – San Francisco
Tennessee Coal & Iron – Fairfield, Alabama
United States Steel Supply – Steel Service Centers
United States Steel Export Company

United States Steel

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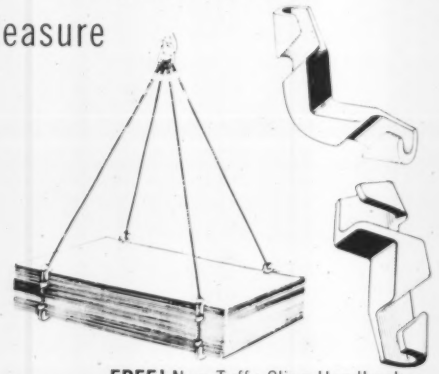

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Even from a 100-foot-high perch, the mammoth size of the bucket of Big Paul, the King of Spades, is hard to comprehend.

There are three of these 70-yard giants—all built by Marion Power Shovel Company. All achieve strength and toughness with least weight by the use of USS "T-1" Constructional Alloy Steel and USS TRI-TEN High-Strength Low-Alloy Steel.

Big Paul sets the pace at the Peabody Coal Company's River King mine near Freeburg, Illinois. It rams through rock and shale to uncover some two million tons of coal per year.

Since 1950, the art of big shovel making has increased dipper size from 35 to 45, 55, 60, and now 70 cubic yards per bite. Most of the buckets and dipper sticks of these giant shovels are made of USS "T-1" Steel, for otherwise, it would be almost impossible to make them light enough and tough enough. They hold up in this service, taking terrific impact abrasion and shock loading, even in the dead of winter. This is possible because USS "T-1" Steel retains its toughness at temperatures far below zero.

Dipper Size Increased 25%

USS "T-1" Steel has often enabled a boost in the capacity of original equipment without increasing weight. For example, a 20-yard bucket was replaced with a 24-yard "T-1" Steel job. Other dippers were boosted from 26 yards to 32, and 36 yards to 45—increases of 25%.

Many other parts—dipper stick, bail handles and crowd rack—are built stronger and lighter with this 90,000 psi minimum yield strength constructional alloy steel. (USS "T-1" Steel plates up to 2½ inches thick inclusive are *now* available with a minimum yield strength of 100,000 psi.)

The booms and A-frames of most shovels over 45 yards are designed with high-strength low-alloy steels with 50,000 minimum yield point . . . usually USS TRI-TEN Steel.

Perhaps you need a steel that offers higher yield strength, extraordinary toughness and resistance to impact abrasion, combined with relative ease of fabrication. USS "T-1" Steel is your answer, and we'll gladly help you adapt it to your application. For free booklet, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania

USS, "T-1" and TRI-TEN are registered trademarks

◀ 70-yard dipper and handle, crowd rack, bail and sheave blocks—all built stronger and lighter with USS "T-1" Steel

United States Steel Corporation – Pittsburgh
Columbia-Geneva Steel – San Francisco
Tennessee Coal & Iron – Fairfield, Alabama
United States Steel Supply – Steel Service Centers
United States Steel Export Company

United States Steel

Navy goes fission again

On this vertical boring mill at U. S. Steel's Homestead Plant, you see a forged steel flange that will serve aboard one of the Navy's new guided missile frigates. These are an entirely new class of naval vessel—their primary mission is the destruction of air targets and they are nuclear-powered.

The flange will be welded to other forged steel parts to form a sealed nuclear reactor vessel. Only a forging of the very best quality is suitable for this critical service. To obtain this quality, vacuum-cast electric furnace steel was used. The flange was carefully forged from a Ni-Cr-Mo alloy ingot about 72" in diameter and was heat treated to meet rigid specification requirements. Mechanical tests as well as magnetic particle and sonic inspection methods were utilized to assure a quality product. As shipped, the flange weighed over 21½ tons.

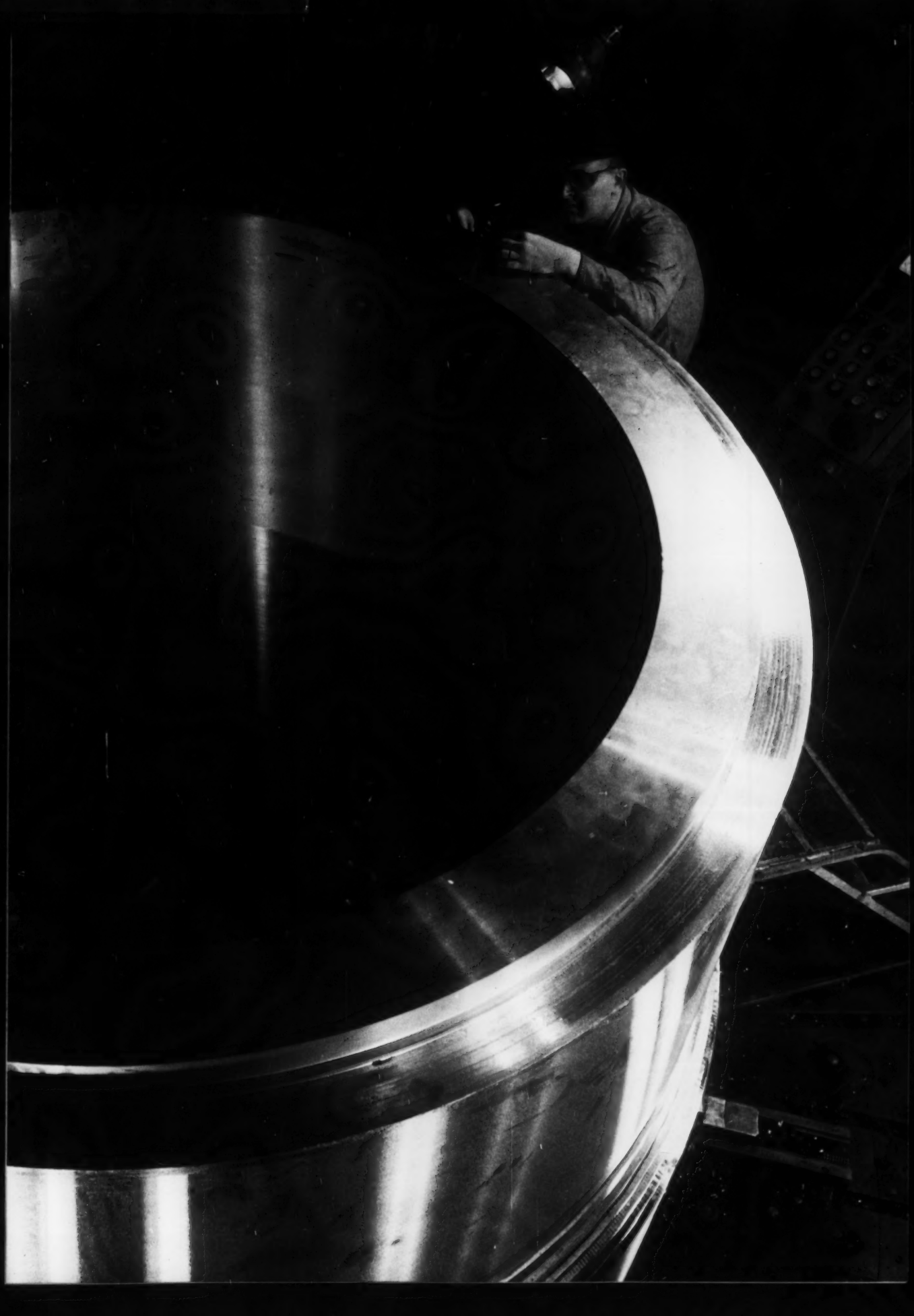
Many nuclear forgings like this one are made by U. S. Steel because here, the complete production is supervised and controlled by a team of forging experts. They melt the steel, pour the ingot, forge, heat treat and machine it. The very same team of USS Forging experts who made this flange will fill your order. We welcome your inquiries or requests for our free 8-page booklet about USS Nuclear Forgings. Write to United States Steel, 525 William Penn Place, Room 6031, Pittsburgh 30, Pa.

USS is a registered trademark

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Export Company

United States Steel

USS



The side and end walls of this annealing furnace in a mid-Western steel foundry are built of 4½" block insulation and 9" of A. P. Green's "Kast-o-lite," a castable bonded with LUMNITE cement. The roof arch contains 9" of "Kast-o-lite," covered with 2" of A. P. Green's Castable Block Mix. The door lining and car top are also built with A. P. Green castables.

Insulating refractory concrete improves furnace operation

Insulating refractory concrete, made with LUMNITE calcium-aluminate cement, is being specified for complete linings and car tops in many types of industrial furnaces. It provides lightweight monolithic construction that trims fuel costs, reduces heat loss and increases furnace efficiency.

By reducing heat loss and heat storage, insulating refractory concrete linings help shorten heating-cooling periods. Closer temperature control is possible. And the smooth, jointless castable surface will also reduce air infiltration, providing economical furnace operation.

Insulating refractory concrete is easily cast in place, using simple forms. It reaches service strength in 24 hours. For extra convenience, insulating refractory castables, bonded with LUMNITE cement, are available from leading manufacturers of refractories. These are packaged mixtures, ready to use with just the addition of water.

For more information, write Universal Atlas Cement, 100 Park Avenue, New York 17, N. Y.

L-190

"USS," "Atlas" and "Lumnite" are registered trademarks

Universal Atlas Cement
Division of
United States Steel

OFFICES: Albany · Birmingham · Boston · Chicago · Dayton · Kansas City · Milwaukee · Minneapolis · New York · Philadelphia · Pittsburgh · St. Louis · Waco

NOW...

Consistent Quality Assured in EVEN COMPLEX alloys

Fast . . . Modern, Quality Control Analysis Insures Correct Metal Chemistry

Today . . . Ross-Meehan is pouring complex alloys with even greater assurance . . . strict adherence to chemical composition is made *prior* to pouring the melt. Waste vanishes . . . furnace time is reduced to a bare minimum . . . your specifications are assured . . . and resulting savings are *yours!*

Our Baird Atomic Direct-Reading Spectrometer is the latest of scientific measuring instruments added to our already nationally-famous metallurgical laboratory. Detailed analysis of metals and alloys takes only minutes . . . from melt shop to lab and back . . . foreign elements are identified . . . and indicated corrections are made.

Whether your castings require dimensional or metallurgical accuracy from MEEHANITE Metal, NI-RESIST, NI-HARD Iron, Plain Carbon Steel, DYNALASTIC Steel, Low and Intermediate Alloy Steel, Stainless Steel, or High Alloy Heat Resisting Steel . . . depend on the "Foundryman's Foundry" . . . ROSS-MEEHAN. For the complete facts, write, wire or call today!

Baird-Atomic Direct-Read Spectrometer

FAST, ACCURATE DETERMINATION OF CHEMICAL COMPOSITION . . . RELIABILITY WITH OPERATIONAL EASE

- Parallel Interchangeable Readout Channels
- Automatic Optical Servo Monitor
- Logarithmic Presentation of Results

ROSS-MEEHAN FOUNDRIES

[redacted] CHATTANOOGA, TENN.

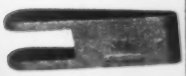
Bevel Gear — Cast by Shell Process

Pump Impeller — Shell Process Casting of Meehanite®, Type GS

Precise Investment Castings through Shaw Process Molding

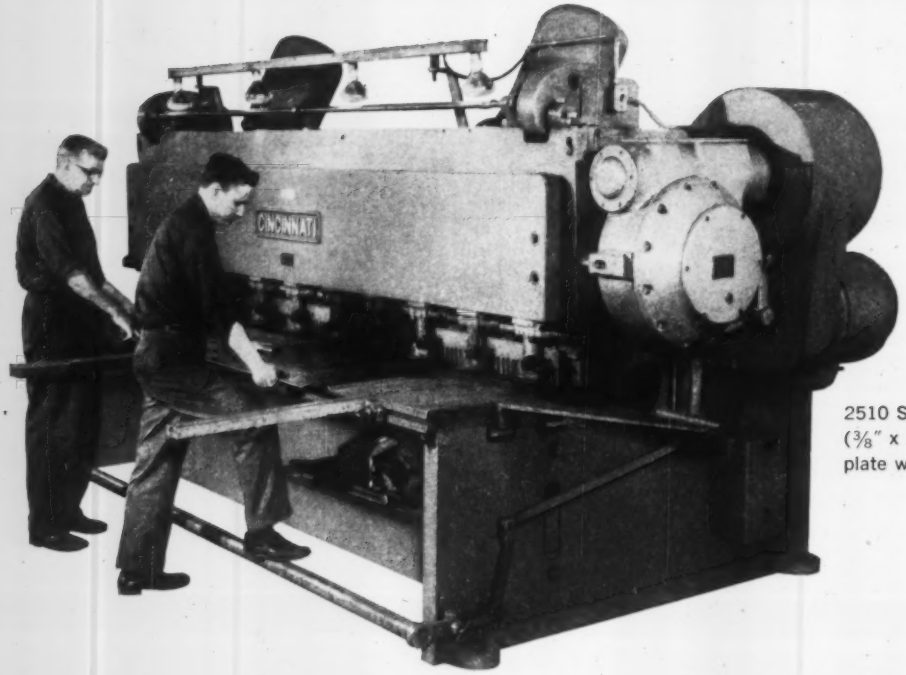
Trunnion for Steel Cylinder — Dynalastic® Steel Casting. Weight — 135 lbs. Length—24 ins.

Debarking Tool — Dynalastic® Steel Casting. Weight — 14 lbs. Length — 15 ins.



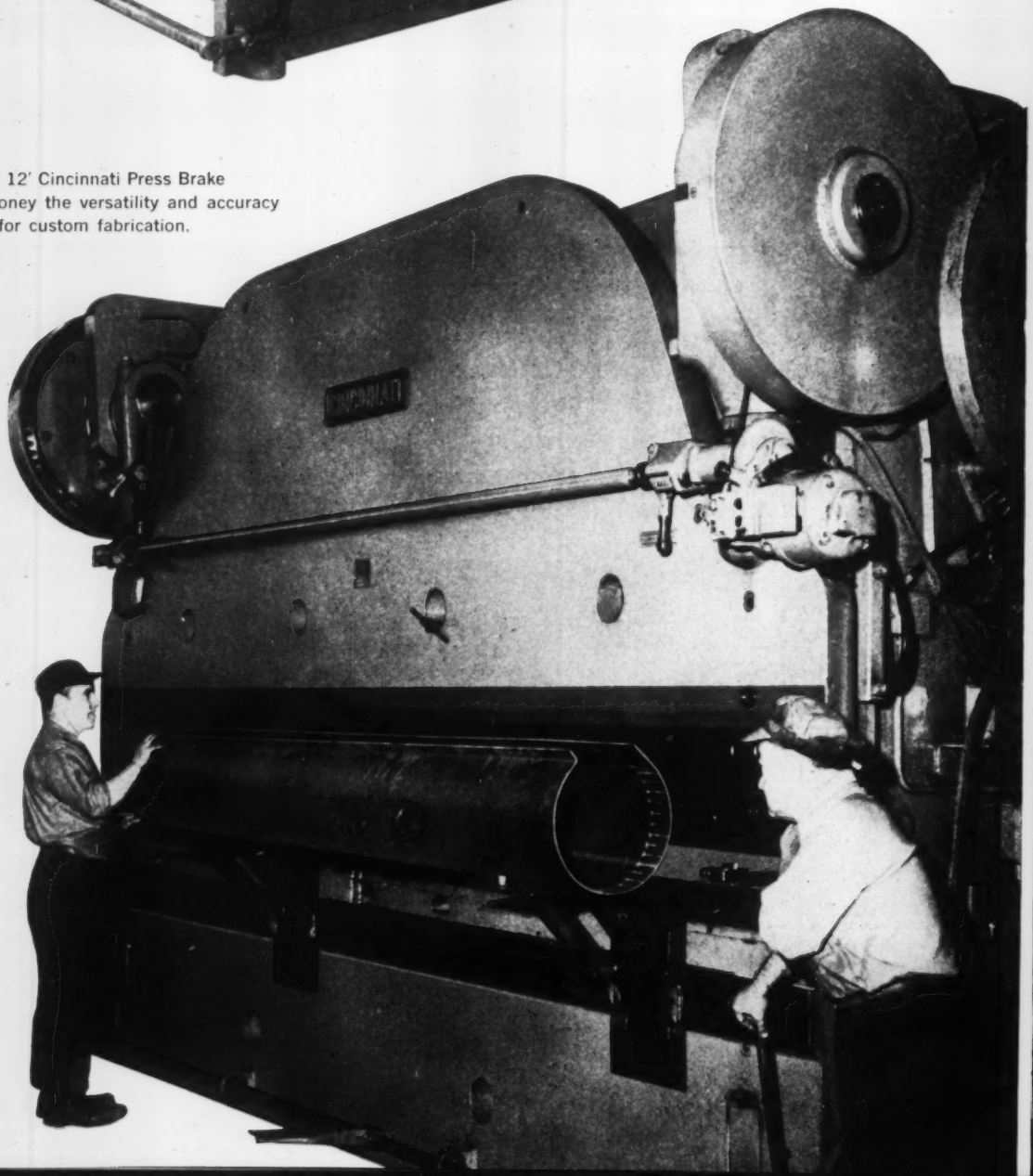
Yoke for earth moving machine. Weight — 5 lbs. Length — 8 ins.

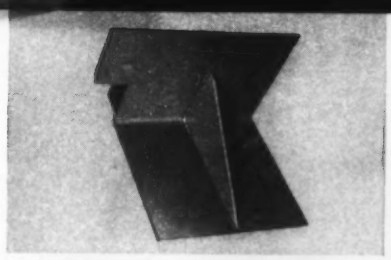
Crankshaft — Oil Drilling Rig. Wt.— 1500 lbs. Length — 4 ft.

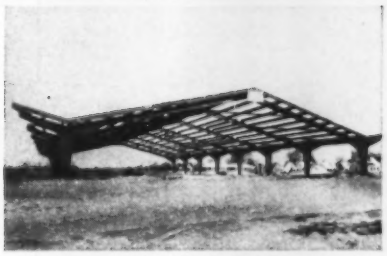


2510 Series Cincinnati Shear (3/8" x 10' capacity) cuts steel plate with consistent accuracy.

13 Series 12' Cincinnati Press Brake gives Mooney the versatility and accuracy required for custom fabrication.







"From brackets to buildings," Mooney Iron Works Co. fabricates steel products on maintenance-free Cincinnati Press Brake and Shear.

"Not a penny's worth of maintenance since 1953!"

"We haven't spent a penny on maintenance of our Cincinnati® Press Brake and Shear since we got them in 1953," says John L. Mooney, President of Mooney Iron Works Co., Cleveland.

Yet these two machines have been worked hard, day after day, in Mooney's fabrication of structural steel products which range "from brackets to buildings."

By keeping costs down, this extra-rugged Cincinnati stamina helps Mooney compete aggressively and get new business. You can earn these same profits; put Cincinnati Press Brakes and Shears to work in your shop.

Write Dept. C for Bulletin CS-4, which covers all Cincinnati equipment.

Shapers / Shears / Press Brakes

THE CINCINNATI SHAPER CO.

Cincinnati 11, Ohio, U.S.A.

Here's what Morse's entry into the "Timing"® Belt field means to you . . .

Nobody gives you a more impartial analysis of your power transmission problems than Morse, because . . . *only Morse* offers all four of these basic drives plus a complete line of power transmission products

Basic Drives: Roller Chain, Silent Chain, Hy-Vo® Drives, and "Timing"® Belt.

Chain: High-Endurance (H-E), 8-series (Super Strength), Double-Pitch, Conveyor, Implement, and Attachment; AL, BL, Cable Chain, and Roller-less Lift Chain; Industrial Standard and 3/16″ Silent Chain.

Stock Sprockets: Plain Bore, Finished Bore, Taper-Lock—also made to order.

"Timing" Belt Sprockets: Plain Bore, Taper-Lock, Q.D.—also made to order.

Couplings: Flexible Roller Chain Couplings, Flexible Silent Chain Couplings, Morflex Couplings, Morflex Radial Couplings, and Marine Couplings.

Driveshafts: Morflex and Radial Driveshafts.

Clutches: Cam (Over-Running, Back-Stopping, Indexing); Pullmore; Over-Center, Centrifugal.

Speed Reducers: Eberhardt-Denver "RW" poweR-gear® Reducers; Gear Motors; "L" Worm Gear Reducers; "VX" and "DVX" Conveyor Drives; Miter Boxes; Helical Reducers.

Torque Limiters.

Look for your local Morse distributor in the Yellow Pages under "Power Transmission," or write:

MORSE CHAIN COMPANY, Dept. 2-99, ITHACA, NEW YORK. Export Sales: Borg-Warner International, Chicago 3, Ill. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ontario

1. **"Timing" Belt . . .** for light weight and lubrication-free operation. Morse "Timing" Belts give positive, high-efficiency transmission from 0 to 16,000 FPM, 1/100 HP to 1,000 HP . . . provide slip- and stretch-proof service for life of drive.

2. **Roller Chain . . .** for low and medium speed applications. Precision-finished Morse Roller Chain is specially treated to withstand shock and fatigue, assure less maintenance, longer service life. Patented Spirol Pin Fastener construction.

3. **Silent Chain . . .** for smoother, quieter operation at higher speeds. In Morse Silent Chain the patented rocker joint operates with less friction and wear. It provides a cooler-running chain drive, with higher efficiency and longer service life.

4. **Hy-Vo Drive . . .** for extremely high speeds and horsepower. Exclusive with Morse, extra-tough Hy-Vo Drives transmit mile-a-minute speeds, and up to 5,000 hp loads; require minimum shaft space, usually eliminate outboard bearings.

REMEMBER: The toughest jobs in power transmission come to Morse, because *only Morse* offers one-source service on all four of these basic components . . . and backs them up with technical know-how based on over 60 years' experience solving power transmission problems.

MORSE MORSE BW BORG-WARNER * A BORG-WARNER INDUSTRY

*Trademark

nightmare alley

Not knowing what's going to happen next—this is the most upsetting aspect of nightmares . . . and buying and using many stainless steels.

When you order stainless steel from your nearby *Carpenter* SERVICE-CENTER, you know *in advance* what you're getting:

Predictable performance! Every bar, every order, assures you the advantages inherent in maximum uniformity. You hold production and service problems to a minimum. *Carpenter* has taken the guesswork out of stainless.

Large local stocks! Billet, bar or wire . . . your *Carpenter* SERVICE-CENTER has it. We stock an unusually wide range of grades and sizes to accommodate your most diversified needs.

Technical help extraordinary! No matter how difficult your problem, there's an excellent chance that *Carpenter's* continuing Research and Development Program has already produced information to save you time and money. Other progressive companies take advantage of our metallurgical services. Why don't you?

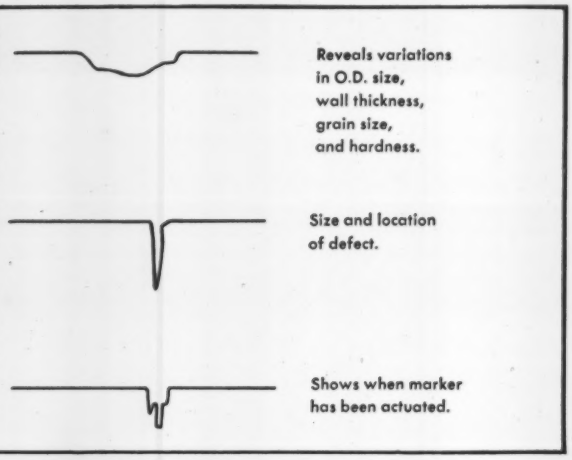
tool and die steels
stainless steels
electronic, magnetic and electrical alloys
high temperature alloys
special-purpose steels
tubing and pipe
fine wire specialties

***Carpenter* steel**

a new company 70 years old

The Carpenter Steel Company, Main Office and Mills, Reading, Pa.
Alloy Tube Division, Union, N. J.
Webb Wire Division, New Brunswick, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.

NEW DAMASCOPE TEST


Reveals variations in O.D. size, wall thickness, grain size, and hardness.
Size and location of defect.
Shows when marker has been actuated.

This flaw is .004 square inches in area
Damascope revealed exact size and location

FOR COMPLETE INFORMATION ON DAMASCOPE TESTING

Write today for four-page bulletin explaining operation and other pertinent data on Damascope inspection.

Here is a new and improved method of eddy current inspection that guarantees each and every piece of Damascus pressure tubing will meet your specifications. Damascope reveals not only the presence of flaws, but their exact size and location. Tubes with surface or sub-surface cracks, seams, splits, holes and inclusions are automatically indicated and rejected.

Over one million inspection feet were run to prove the new test which Damascus now employs as a regular production check on pressure tubing quality.

DAMASCOPE "Eddy Current" Test Meets ASTM Area Size Limits on Flaws

Gauge	Wall Thickness (in.)	Minor Dimension of Defect (Length or Depth) (in.)	Area Size Length x Depth (sq. in.)
20	0.035	0.005	0.0020
18	0.049	0.006	0.0024
17	0.058	0.007	0.0028
16	0.065	0.008	0.0032
15	0.072	0.009	0.0036
14	0.083	0.010	0.0040

Tubing passed by Damascope is guaranteed to meet A.S.T.M. specifications as outlined in the Book of Standards, Part 1, covering ferrous metals.

If you employ more stringent requirements, Damascope can be set to even finer sensitivity to yield a super tube at only a slight premium.

NUCLEAR APPLICATIONS

Damascope is one of the first eddy current methods of inspection to be approved for tubing used in critical nuclear work. It has been accepted because of the unique design of Damascope and because power surges previously responsible for variations in test criteria have been eliminated.

STAINLESS STEEL TUBING AND PIPE

GREENVILLE, PENNSYLVANIA

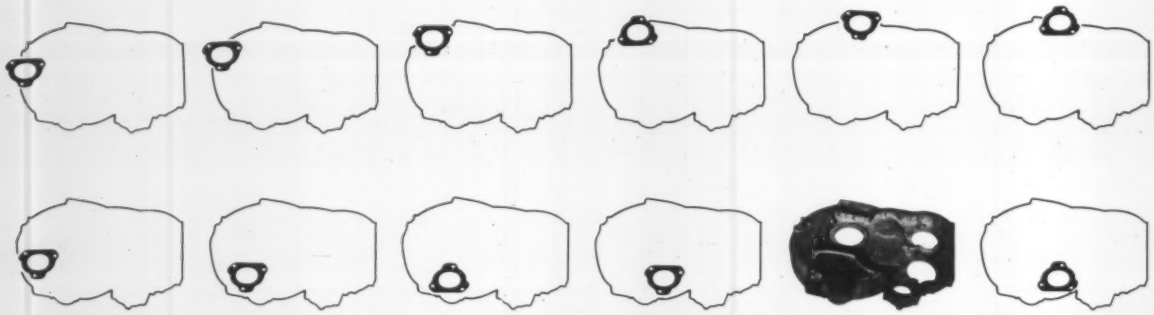
Right now! Numerical control like this can produce for you

. . . Turn the page to see how this Natco does it.

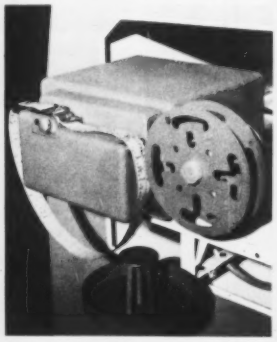
Tape Control Speeds Production

This workpiece comes in many varieties . . .

One multi-spindle Natco machines them all



Numerical control for the production line? Sure! And it's paying its way machining starter holes in over 160 different flywheel housings for small diesels. Even though the starter mounting pads are located differently on each of the housings, this Natco handles each new part with equal ease. It bores the hole for the starter pinion shaft; drills and taps three mounting holes around it.

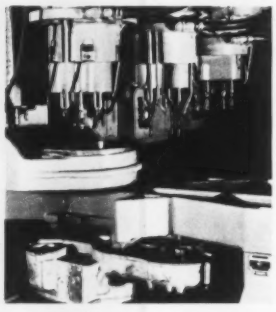


That's the beauty of tape control—the flexibility it gives machine tools like this three column Natco special. Here's practical automation for small lot production!

It's easy and fast to change to a different part. Just substitute a new tape loop in the reader and rotate the drillheads to the new setting. In minutes you're cutting metal again.

No battery of expensive fixtures needed with this machine—the tape locates the part under the drillheads by controlling the motion of the worktable. And inventory can be cut to the bone because even small lots of service parts are run at production part cost.

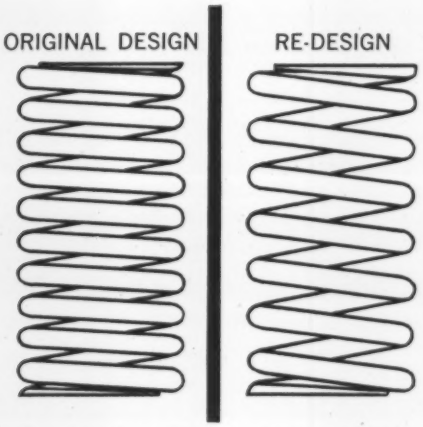
Production lines don't have to wait until tomorrow for numerical control. It's here now, and now is the time to gain the greatest advantage. Let us show you how it can be used to speed your boring—drilling—facing—tapping—reaming jobs. Call your Natco representative today, or write for details.



NATCO NATIONAL AUTOMATIC TOOL COMPANY, INC., RICHMOND, IND.

70 POUNDS OF SPRINGS

were just going along for the ride!



10 coils—.120″ wire
130 lbs. of wire per
1M springs

7 coils—.105″ wire
60 lbs. of wire per
1M springs

Because of mounting cost conditions, a user of motor-support springs asked for a complete design check. Redesigned by A.S.C. engineers, required stresses were met by a slight change in wire size, allowing a reduction in number of coils from 10 to 7. This meant a saving of 70 pounds of material per thousand springs. Because of the shorter length of wire, coiling and grinding speeds were increased, heat-treating time reduced. Saving to the customer—40%.

How about the springs you use? A consultation on your specifications costs you nothing. Just contact any Division of Associated Spring Corporation. For a handy reference to spring action, write for "Spring Design and Selection—in brief."

Associated Spring Corporation **General Offices: Bristol, Connecticut**

Wallace Barnes Division, Bristol, Conn. and Syracuse, N. Y.
B-G-R Division, Plymouth and Ann Arbor, Mich.
Gibson Division, Chicago 14, Ill.
Milwaukee Division, Milwaukee, Wis.
Raymond Manufacturing Division, Corry, Penna.
Ohio Division, Dayton, Ohio
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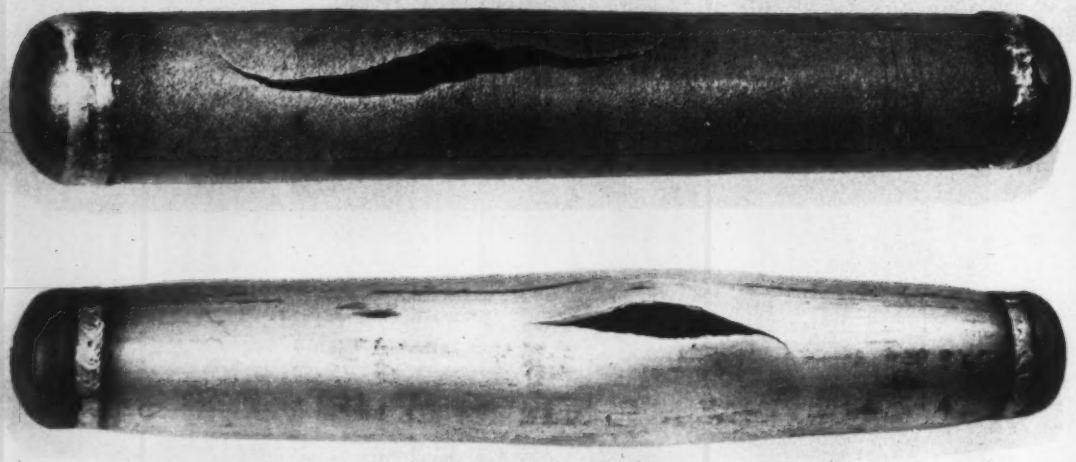
San Francisco Sales Office, Saratoga, Calif.
Seaboard Pacific Division, Gardena, Calif.
Cleveland Sales Office, Cleveland, Ohio
Dunbar Brothers Division, Bristol, Conn.
Wallace Barnes Steel Division, Bristol, Conn.
Canadian Subsidiary: Wallace Barnes Co., Ltd., Hamilton, Ont. and Montreal, Que. Puerto Rican Subsidiary: Associated Spring of Puerto Rico, Inc., Carolina, P.R.

Centrifugally cast Thermalloy tube burst at 77,500 psi



Wrought tube burst at 70,100 psi

Burst tests prove 7,400 psi superiority of centrifugally cast Thermalloy® tubes

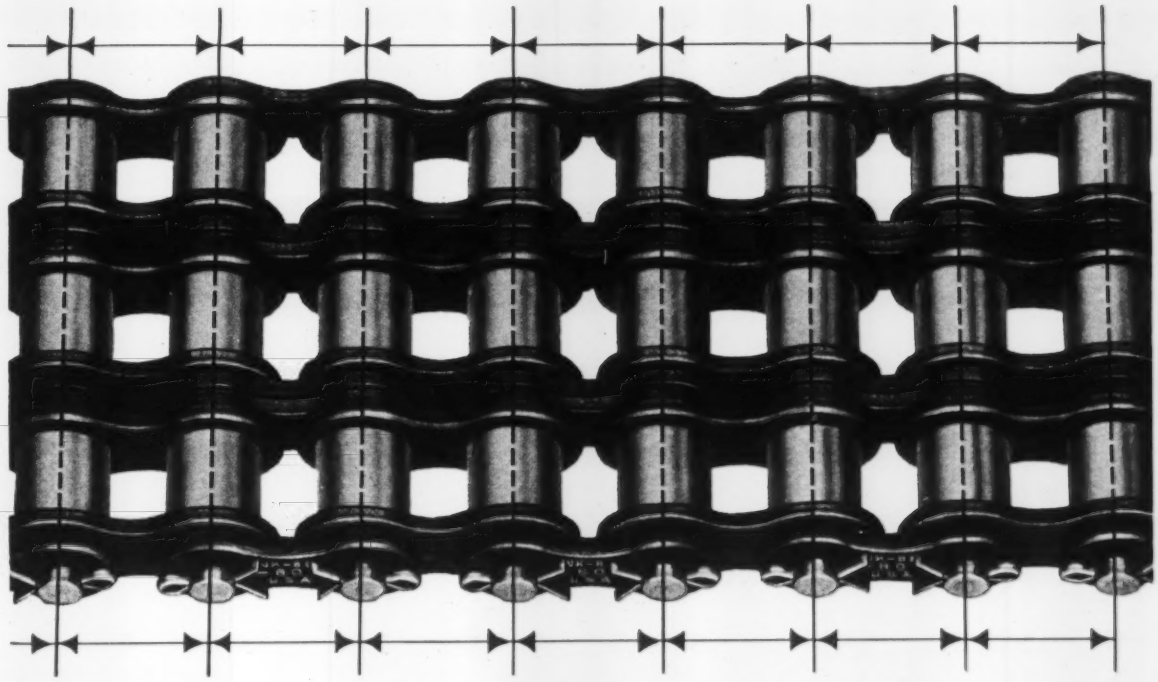
Hydrostatic pressure tests by Electro-Alloys established the rupture of a centrifugally cast Thermalloy tube section at 77,500 psi. Under the same conditions, wrought tubes of comparable section and analysis burst at 70,100 psi. These tests were conducted at room temperatures. Tensile tests show this strength margin increases substantially at the higher operating temperatures (1200°-2200° F). The Thermalloy tube was tested *as cast* —without machining the inside or outside diameter.

Thermalloy is a group of heat-resistant alloys developed for use in the range of 1200°-2200° F. The greater strength of the Thermalloy centrifugally cast tubes makes them ideal for use in radiant tubes, retorts, rolls or other heat-resistant designs employing tubes. For further data, call your representative, or write Electro-Alloys Division, **10299** Taylor St., Elyria, Ohio.

Study these tubes at the National Metal Exposition and Congress, Booth 727, International Amphitheatre, Chicago, November 2-6.

AMERICAN Brake Shoe COMPANY

ELECTRO-ALLOYS DIVISION • Elyria, Ohio



Equal length... equal strength

How pre-stressing ensures uniform load distribution of multiple-width LINK-BELT roller chain

Pre-stressing is one of the reasons why Link-Belt multiple-width precision steel roller chains easily handle the grueling loads common on today's drives. It seats and cold works the chain joint parts, assuring equal load distribution across the chain, minimum initial elongation, increased fatigue life.

Pre-stressing is just one of many "extras" that contribute to the *greater dynamic strength* of Link-Belt roller chain. Others include: close heat-treat control, lock-type bushings, shot-peened rollers, pitch-hole preparation. For details see Book 2657.

PRE-STRESSING MACHINE provides the pull that "sets" the parts of Link-Belt multiple-width roller chain. Besides assuring uniform load distribution, pre-stressing eliminates application difficulties on fixed center drives because the chain leaves the factory at precise operational length.

LINK-BELT

ROLLER CHAINS AND SPROCKETS

BOOK 2657 has 154 pages of roller chain data. Contact your nearest Link-Belt office or authorized stock-carrying distributor. (See CHAINS in the yellow pages of your phone book.)

15,077

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World.

The Image of CF&I

THE CF&I GIANT stands for "steelmanship"—the science of developing new and improved steel products for all industries. An example of how CF&I's continual research benefits *wire users* is our new Black Satin finish on Round and Square Oil Tempered Wire.

Available only from CF&I, Black Satin is a fine, powdery finish that works as a lubricant during coiling and crimping operations. This unique finish is the result of tempering the wire under electronically controlled atmospheric conditions.

Uniformity of Black Satin Oil Tempered Wire Cuts Production Costs

This special finish is uniform throughout the length of each coil . . . from coil to coil . . . from lot to lot. Black Satin's powdery finish prevents surface scale "flake off"—a problem with ordinary Oil Tempered finishes that require constant readjustment of your initial setup. Your benefits: less downtime, less scrap loss, uniform end products.

Black Satin Finish Increases Output

To lengthen your production runs, CF&I can supply you with this top quality Oil Tempered Wire in continuous unwelded lengths up to 600 lbs. These large coils minimize the extra rethreading time required by smaller coils.

This outstanding Oil Tempered Wire is available in a full range of gages and sizes, in steel-strapped or wire-tied coils from 16″ to 72″ in diameter. Straightened and cut lengths from 6″ to 24′ (or longer) can also be supplied.

Identification Tags Assure Uniform Wire Grades

To assure the same steadfast quality from coil to coil, CF&I color tags every coil for a reliable record of its processing, testing and intended use. By merely returning the tags when you reorder, you automatically receive the same uniform quality on all subsequent orders for the same grade of wire.

offers . . .

BLACK SATIN

a unique Oil Tempered wire finish to cut your production costs

These tags show:

Heat Number_____

Size_____

Tensile Strength_____

Date_____

Coil Number_____

Test Sheet Number_____

This color tag system also facilitates your job of inventory control, in-plant storage, and materials handling.

Besides Oil Tempered Wire, CF&I supplies all types of quality steel wire—and you can specify your wire *packaged for your production.* These different packages offer you various operating advantages from less machine downtime to easier unloading, storage, inventory control and continued cleanliness of the wire.

Because of CF&I's wide diversity of wire types and wire packages, it would pay you to make CF&I your source of supply. Our experienced representative will be glad to discuss your requirements with you. Call him today.

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

6770

In the West: **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Farmington (N. M.) • Ft. Worth • Houston Kansas City • Lincoln • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • San Leandro • Seattle • Spokane • Wichita

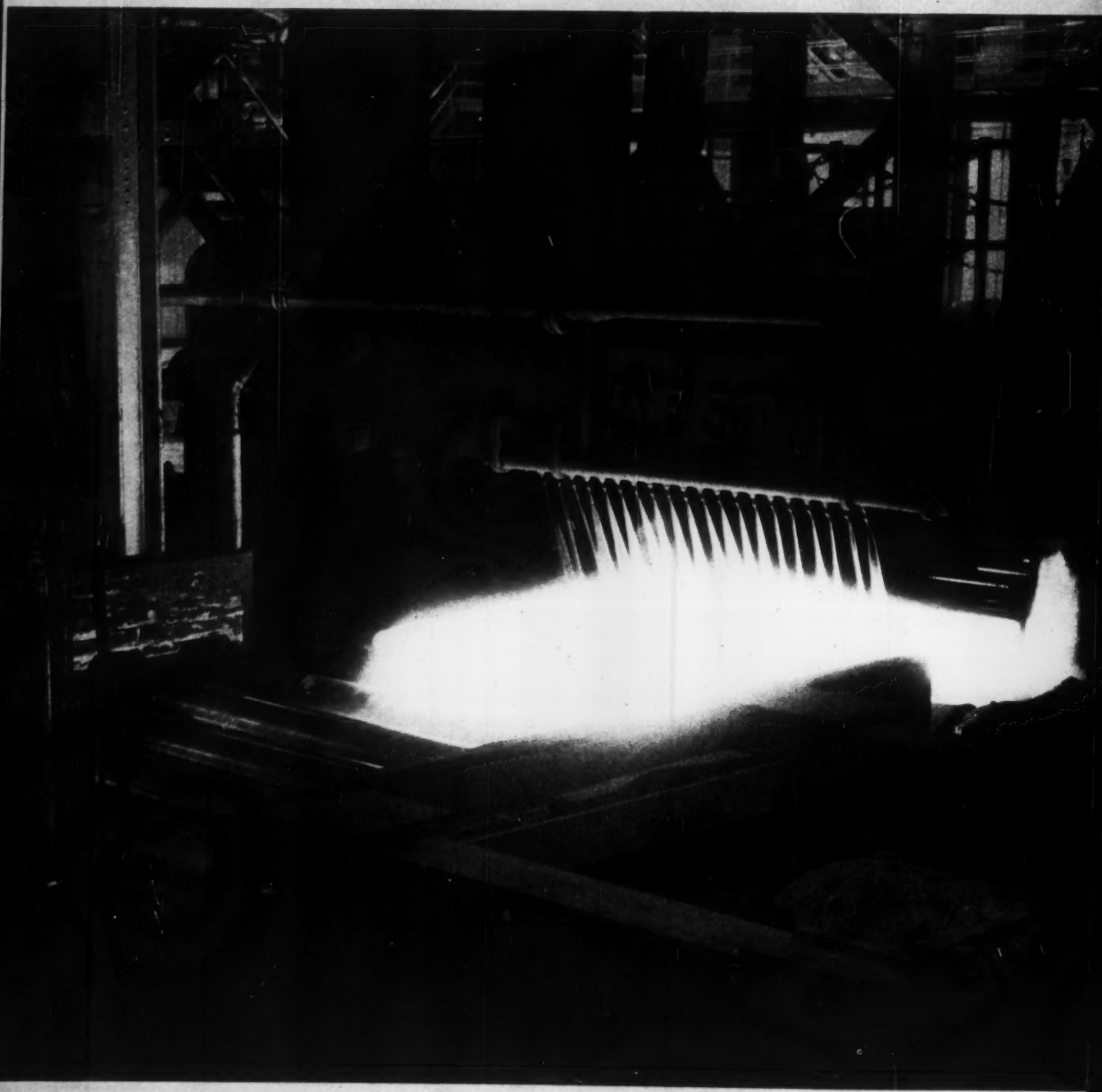
In the East: **WICKWIRE SPENCER STEEL DIVISION**—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

CF&I OFFICE IN CANADA: Montreal • **CANADIAN REPRESENTATIVES AT:** Calgary • Edmonton • Vancouver • Winnipeg

DE LAVAL

CENTRIFUGAL PUMPS

for high-pressure

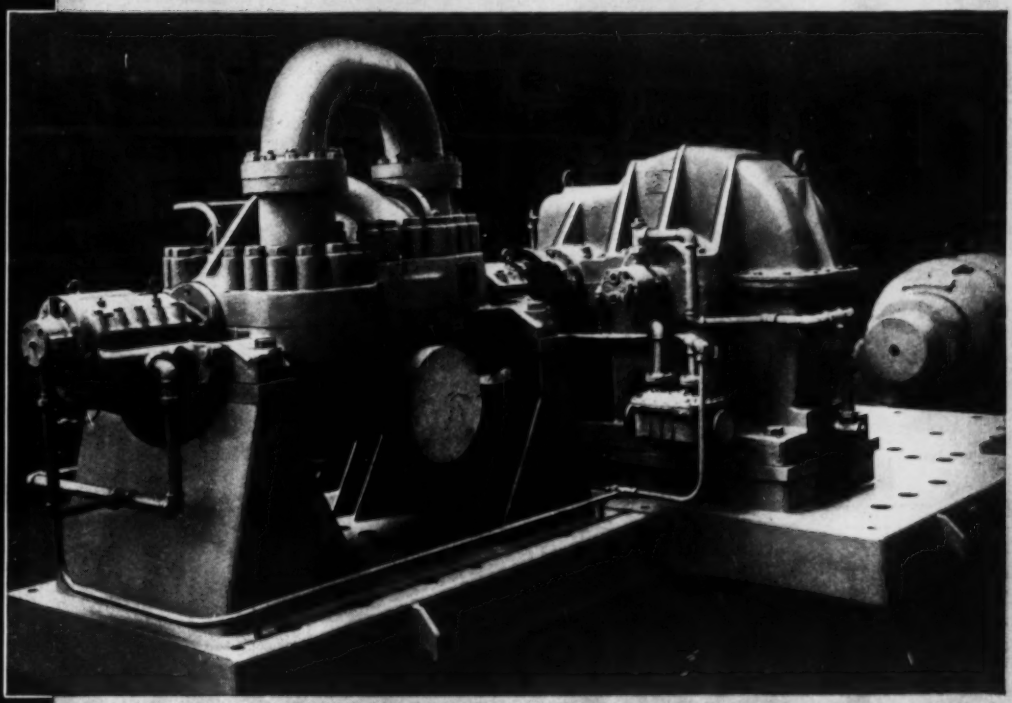


descaling at Lukens Steel

Latest successful technique of high-pressure descaling is now being performed in this modern steelmaking facility designed by Mesta Machine Co.

The initial high-pressure descaling operation uses De Laval split-case multi-stage pumps as shown in the photograph below. Each pump supplies cold water at 1000 gpm and 1600 psig. Electric motors rated at 1750 hp drive the pumps through speed increasers which raise the speed from 1200 rpm to 4250 rpm.

De Laval pumps also serve Lukens on a 1200 psig descaling system in another section of the Coatesville, Pa. mill.



One of several arrangements available for descaling service at pressures of 1000-1200-1600 psig and capacities to 2200 gpm.

DE LAVAL *Steam Turbine Company*

860 NOTTINGHAM WAY, TRENTON 2, NEW JERSEY

GENERAL ELECTRIC GAS OR ELECTRIC BELL FURNACES GIVE BRIGHT FINISHES AT LOWER COST

Your investment in a General Electric gas or electric bell furnace will pay off in maximum flexibility and minimum spoilage.

And here's an example of what we mean by minimum spoilage. The electric bell furnace pictured below produced perfect wire on the first heat after start up, and has now operated for a full year without spoilage.

The gas-fired bell furnace on the right below was purchased to supplement a continuous pusher furnace. The flexibility provided by "batch" operation of the bell furnace produced real savings in time and money on small loads that require different temperatures and heat treatments.

General Electric bell furnaces can handle many jobs for you . . . a bell furnace is inherently capable of working many shapes and sizes. Operation is simple. Your new General Electric bell furnace can be controlled easily for quick changes of heating cycles and temperatures. Bell furnaces are available in a wide variety of job-tested sizes for you to select from. A complete line of gas atmosphere producers and control equipment is also available. General Electric bell furnaces produce quality work finishes because of the high volume circulation of atmosphere which provides a uniformity of heating. The metal retort contains and controls the protective atmosphere for cleaner, brighter work.

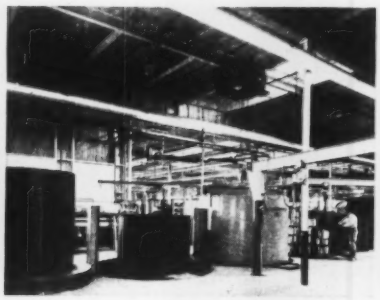
Call your General Electric heating specialist now. He'll show you how your investment in a gas or electric bell furnace system will pay for itself. Use the table below to see how you can use a bell furnace in your business.

Contact your nearby General Electric Apparatus Sales Office, or write Section 721-23, General Electric Company, Schenectady 5, New York.

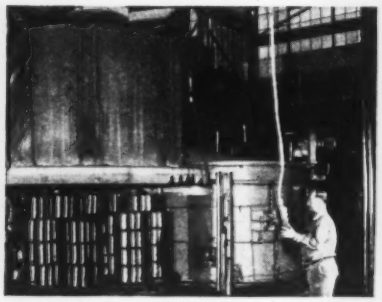
GENERAL ELECTRIC

Applications	Castings	Forgings	Rod & Bar	Wire - Coils	Wire - Spools	Tube - Coils	Strip - Coils	Foil - Coils	Fabrications
Aluminum and Alloys	X	X		X	X	X	X	X	X
Copper and Alloys				X	X	X	X	X	X
Iron and Alloys	X	X	X	X					X
Stainless Steel Alloys			X	X		X	X		X
Magnesium and Alloys	X	X		X	X	X	X	X	X
Nickel and Alloys				X	X	X	X	X	
Silver and Alloys				X	X	X	X	X	
Titanium and Alloys				X	X	X	X	X	X

General Electric gas or electric bell furnaces find wide application in almost every phase of metalworking, as demonstrated by above chart.



This electric bell furnace, for example, produced bright, perfect wire on its initial run, and has now run one full year without a pound of spoilage.



This gas-fired bell furnace was purchased from G.E. to provide supplementary batch furnace capacity to handle special loads of copper wire at lowest cost.

Who Buys Roebling Upholstery Spring Wire After You Do?

The end-user can hardly be expected to know a great deal about Roebling helical spring wire, border and brace wire, zigzag and no-sag wire, wire for automatic machines, lacing wire...

Thus, the qualities of uniformity, temper, tensile strength, size and finish that are yours whenever you use Roebling Spring Wire mean long life, resiliency under constant use (and abuse) where it counts the most...to those who buy Roebling Upholstery Spring Wire after you do.

For further information on the wide range of types, the consistent superiority and availability of these and other Roebling wire products, write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

Roebling...Your Product is Better for it

ROEBLING

Branch Offices in Principal Cities

Subsidiary of The Colorado Fuel and Iron Corporation

THE OTHER TURN

THERE'S THE SWEDE TRYING TO TELL THE OLD MAN HIS HEAT IS HOT AND THE RODS ARE NO GOOD.
IF HE TAPS THAT ONE THEY CAN BRICK IT UP AND USE IT AS ANOTHER LADLE.
-MANY MORE RODS ON THAT HEAT AND HE WON'T HAVE ANYTHING LEFT TO TAP.
THANKS TO
RALPH T. KNISALY
MELTER FOREMAN
BETHLEHEM STEEL CO.
JOHNSTOWN, PA.
HUEKES

The Cold Heat

WHY NOT DESCRIBE YOUR OPEN-HEARTH CARTOON IDEA AND SEND IT ALONG TO US?

The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.

Magnefer and Syndolag Set Fast—Stay Fast

BASIC INCORPORATED 845 HANNA BUILDING • CLEVELAND 15, OHIO

Metalworking Outlook

September 28, 1959

The Case of the Vanishing Profits

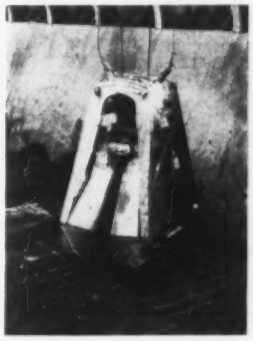
One of the most futile business maneuvers is price fighting. Yet it's going on in wide areas of metalworking—because of ignorance of true costs, foreign competition, holdovers from 1958 recession practices, or plain economic ruthlessness. Price fighting can be minimized by greater cost knowledge, by selling on quality and other factors rather than price, and by using economic guts. Everyone applauds legitimate price cutting when true costs decline, but most managers agree that price warfare is economic suicide (Page 82).

Strike Sends Canada to New Steel Sources

Canada has found the steel strike in the U. S. easy to live with. Reasons: 1. The Canadian steel industry has become much more self-sufficient in recent years. 2. Users built up large stocks in anticipation of the strike. 3. Some users have switched to European and Japanese suppliers. Canada needs to import about 1 million tons of finished steel annually; 60 per cent normally came from the U. S. But U. S. producers now wonder whether they'll be able to regain their Canadian customers after the strike is settled, or whether they'll continue to buy from Japanese and European firms.

Ore Shortages May Cripple Steelmaking

With only 37 ore carriers moving Lake Superior ore (out of a lake fleet of 243 vessels), steelmen are getting worried about stockpiles for next spring's operations. Just a trickle of ore, 797,979 gross tons in August vs. almost 13 million tons in June, is moving down lakes. Steelmakers will barely scrape through spring production if: The steel strike ends about Oct. 1; lake vessels resume shipping quickly; December weather permits ore shipping; eastern stevedores, handling foreign ore, don't strike; rail labor doesn't halt traffic with strikes (Page 79).



Pace Sees No Slackoff in Defense Efforts

Don't look for the sometimes folksy friendliness of Premier Khrushchev to bring any cutback in defense orders in the near future. Says General Dynamics Corp. Chairman Frank Pace Jr.: "Nothing short of a workable ironclad disarmament agreement with Soviet Russia would ever allow this country to consider slackening its over-all defense effort. It would appear,

therefore, whether the Russians smile and speak softly, or whether they speak harshly, defense will remain at or near current levels in the absence of some unique change in world affairs."

Tomorrow's Engines Are Humming Today

Listen in on the field testing being done by International Harvester Co., Chicago, and you'll hear the roar of tomorrow's gas turbines and free piston engines. The new engines will be powering gigantic earth movers, farm machines, and trucks, predicts Carl H. Miele, chief engineer of IH's research division. Although production isn't scheduled till 1975, test powerplants are already running field maneuvers in conventional equipment. In one case, a 330 lb turbine does the work of a 4000 lb diesel. Harvester doesn't foresee too many changes in metals or techniques: "Look for more castings and a shift to higher temperature metals like stainless." For free-wheeling ideas, see Page 130.

How Personal Income Is Distributed

Per capita personal income in the U. S., climbed to $2057 last year, reports National Industrial Conference Board. Eighteen states and the District of Columbia topped the $2000 mark. Connecticut led the nation with per capita income of $2817. Delaware was second with $2760. New Mexico showed the sharpest increase, climbing 58 per cent to $1838 since 1950. Per capita income in major metalworking states: New York—$2585; California—$2559; Illinois—$2435; Ohio—$2184; Pennsylvania—$2127; Michigan—$2099. Lowest rate in the nation: Mississippi's $1053.

Canmakers Push Tin Plate Toward Record Year

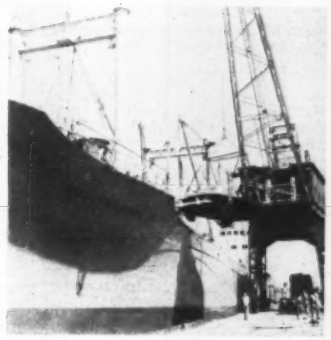
Only an even more prolonged walkout in basic steel or strikes against tin can producers can stop the canning industry from consuming a record tonnage of tin plate this year. In the first half, canmakers used 3,375,301 tons of terne and tin plate vs. 4,884,473 tons in all of last year. Tin mills are losing some markets, notably beer and motor oil containers, to aluminum. Bottlers are dismayed to see more soft drinks packaged in cans. Plastic containers are the fastest growing segment of the industry (Page 171).

Galvanized Sheet Demand Hits Peak

Shipments of galvanized steel sheets during the first half of this year came to a record 1,876,683 tons—up about 50 per cent from the like 1958 period, reports the Committee on Galvanized Steel Sheet Research. Shipments to

the automotive industry jumped 111 per cent this year vs. last. Contractors products continue as the biggest market; the category took 694,995 tons during the first half—49 per cent more than in the like '58 period. Shipments to warehouses and distributors rose 41 per cent, and appliance makers took 61 per cent more.

Seaway: Mostly One Way?

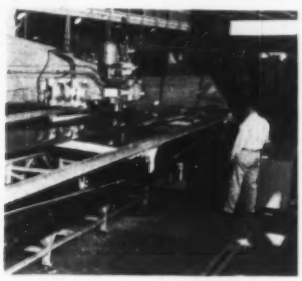


The St. Lawrence Seaway, in operation only five months, is already being criticized for inadequate lake linkage and port facilities. Traffic has not met expectations; it has risen only 49 per cent, not the 100 per cent predicted last year. Some say it will become a monster, consuming funds for patchwork remedies. Others see it as a new kind of foreign aid program, helping foreign companies more than domestic firms with export plans (Page 92).

Cleveland Team Courts Industrial Prospects

Cleveland Electric Illuminating Co. reports that its area development department is talking with 48 industrial prospects who can bring $100 million in new investment to the area if they decide to locate facilities in the "Cleveland Corridor." President Elmer L. Lindseth, speaking at a premier of the company's latest movie on the Cleveland area, said that industry has committed more than $82 million for new plants and expansion in northern Ohio so far this year. The corridor, an 85 mile stretch of land running from Cleveland to the Pennsylvania border along Lake Erie, includes the four Seaway ports—Cleveland, Fairport, Ashtabula, and Conneaut.

Riveting Regains Some of Old Luster



Rivetmakers are cheered by improved business in the first seven months of this year; they feel that recovery from the recession and a general pickup in rivet interest are well underway. When Rosie the Riveter quit after World War II, and aircraft and construction industries went to welding and bolting, rivets took a nose-dive. Now prospects look brighter (Page 80).

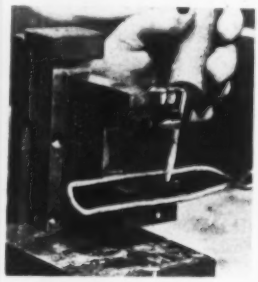
Bethlehem Revises Bonus Plan

Bethlehem Steel Corp. has agreed to the settlement of a minority stockholders' suit which alleged that company executives were being overpaid by a bonus plan—cash compensation was based on a percentage of common stock dividends paid out annually. Under the settlement plan, dividend

units will be credited to executives in proportion to their cash remuneration. The units will be computed from the firm's consolidated net income rather than from dividends paid. The new plan places a ceiling on total compensation to executives—it must be at least 11 per cent lower than that received previously. The plan will also bring a $2.4 million saving yearly.

Induction Brazing Simplifies Production

High frequency heating permits placing the heat where it is needed, in controlled amounts. Such precision has simplified production of tools and gages in two plants. Advantages: The rest of the workpiece remains cool so that holding the work is easy; the equipment can be run in the production line to eliminate extra handling; with short heating times, scale is not a problem, localized heating avoids warpage at required temperatures (Page 140).



Industrial Furnace Makers Ride the Spending Boom

During August, industrial furnace makers received orders totaling $9,738,000 —up 176 per cent from the August, 1958, total. Net new orders for the first eight months of this year amounted to $66.9 million—up 153 per cent from those in the like 1958 period. August orders for induction heating equipment rose to $1,283,000—up 231 per cent from the 1958 pace. Induction heating equipment orders so far this year are 180 per cent better than in the like 1958 period.

Business Birth Rate Highest Since '47

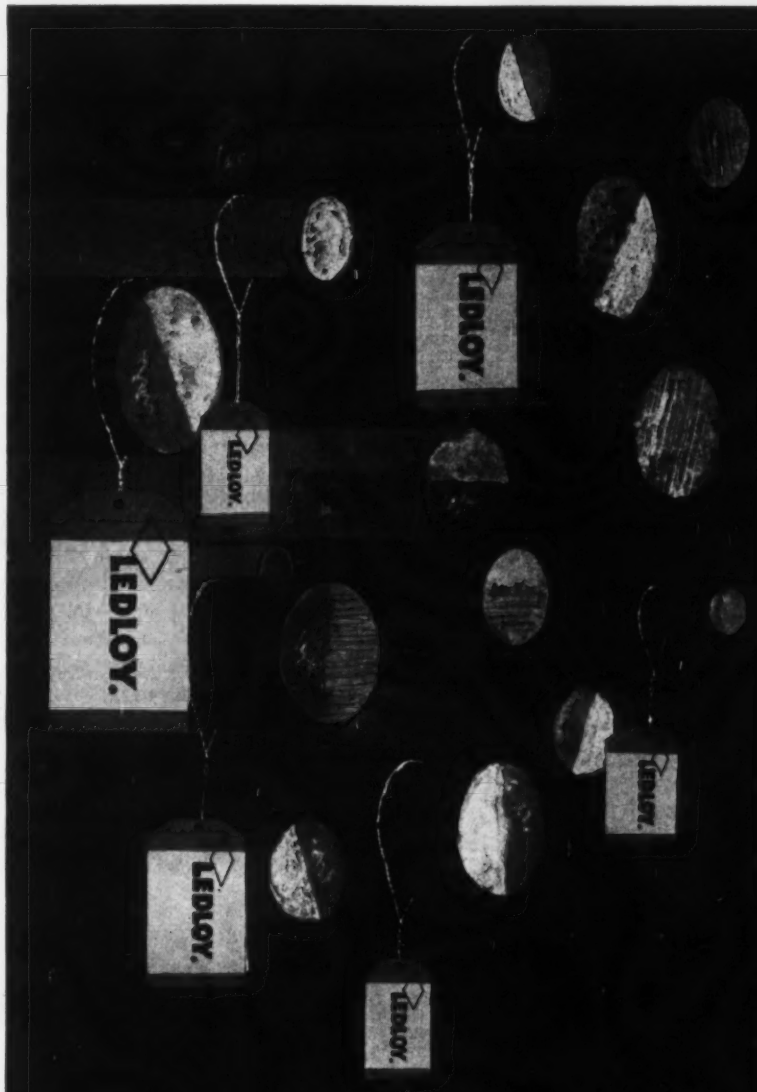
Today, a record 4,645,000 businesses are operating in the U. S.—75,000 more than a year ago. Not since the postwar boom of 1947 has the business birth rate been so rapid. The average annual increase is 60,000. There are 1.4 million more firms in the U. S. today than at the end of World War II. We have about 26.5 nonfarm businesses per 1000 persons. Growth is largely in the service industries.

Collapsible Tube Makers Boost Metal Consumption

In making a record 586 million collapsible tube containers in the first half of 1959, the industry used 6482 tons of metal, reports the Collapsible Tube Manufacturers Council. Breakdown: 3263 tons of lead, 2494 tons of aluminum, and 375 tons of tin.

Straws in the Wind

Norge Div., Borg-Warner Corp., reports factory volume of home appliances through August ran 35 per cent ahead of the year ago pace . . . Armour & Co., Chicago, is the first detergent maker to switch to rigid polyethylene containers. . . . Factory sales of gas water heaters in August rose 16.6 per cent over the August, 1958, level, says the Gas Appliance Manufacturers Association.



NOT ALL LEADED STEEL IS MADE BY INLAND...

BUT...

we've made more of it than anyone else . . . in fact, the first experimental heat and the first production heat of leaded steels were made in Inland furnaces.

Since then, more than 20 years ago, we've never stopped probing, refining, perfecting the process. And today we offer INLAND LEDLOY*—the leaded steels of highest quality, uniformity and dependability—the standard against which all other free machining steels are compared!

If you have any question about leaded steels . . . if increased machinability, higher speeds and feeds, easier tolerance control, greater production per tool change and fewer finishing operations sound good to you . . . we suggest you come to Inland . . . makers of LEDLOY, the original leaded steel.

INLAND LEDLOY steels are available in a wide range of standard carbon and alloy grades in bars or plates from your Cold Drawer or Steel Service Center. See them for LEDLOY and write to Inland for the booklet, "Properties of Inland Ledloy Steels".

*Reg. Trade Mark

LEDLOY *the world's most machinable steels!* INLAND STEEL *30 West Monroe Street · Chicago 3, Illinois*

INLAND *Sales Offices:* Chicago · Davenport · Detroit · Houston · Indianapolis
Kansas City · Milwaukee · New York · St. Louis · St. Paul

ARMCO FREE-MACHINING BARS

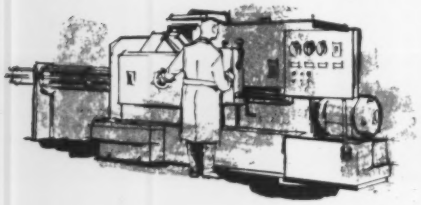
Help You Cut Costs on Stainless Jobs... From Start to Finish

In Your Planning—

11 grades of Armco FM Stainless offer a wide range of sizes, shapes and finishes. They enable you to save right off the bat: Use higher speeds, remove less metal, even eliminate some operations.

Screw Machines Secondary Operations—

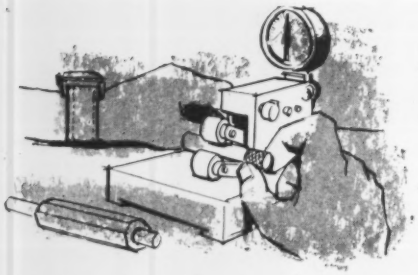
Uniform machinability of Armco FM Stainless assures maximum production, makes it easier to hold size and finish tolerances. Use Armco's manual, motion picture, or machining specialists to eliminate "bugs" and for production-increasing tips.



Inspection—

Armco FM Bars are pre-inspected at the mill with the most modern magnetic equipment. Defective bars with cracks, seams and slivers don't get in your order. Costly rejects that waste your time and money are reduced.

Try Armco Free-Machining Bars on that next stainless job. See how they can help you cut costs. For information on sizes, shapes and grades available, as well as helpful machining information, just fill out and mail the coupon.



New steels are born at Armco

ARMCO STEEL CORPORATION, 1619 Curtis St., Middletown, Ohio

SEND ME ☐ Information on sizes and grades of Armco FM Stainless
☐ Your manual, "Machining Armco Stainless Steels"

☐ We would like to borrow your motion picture, "Machining Stainless Steel."

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COMPANY_____

STREET_____

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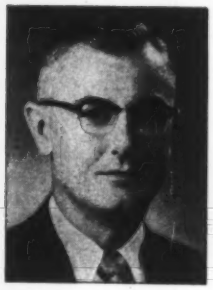
Rustless

ARMCO®

ARMCO STEEL

Armco Division • Sheffield Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation



Strike Against Survival

As the steel strike drags through its eleventh week, signs mount that it soon will cost additional hundreds of thousands of workers their pay checks. Hundreds of steel using plants will be closed for lack of material.

Within a few weeks, the toll could become millions of workers and thousands of closed plants.

As we contemplate the rather dreary prospect, we wish that the union leaders who called the strike and their members would spend their idle time studying the foreign trade figures on steel products. They would learn:

Steel imports have mounted each month this year. Steel exports are down sharply.

During the first seven months, we brought in 2,346,000 tons of foreign steel products. For the year, imports are likely to exceed 4 million tons. That represents 36,000 lost jobs for steelworkers.

We wish the United Automobile Workers officials who threaten an industry-wide slowdown if Taft-Hartley is invoked in the steel walkout would study the registration figures on foreign autos in the U. S. They would find:

Foreign car registrations for seven months this year exceed 345,000 units, more than 20 times the annual rate only six years ago. About 600,000 foreign cars will be registered this year.

Those imports represent 56,000 lost jobs for autoworkers, plus additional thousands of jobs lost because of reduced exports of American-built cars.

We wish a lot of American unionists could have visited the European Machine Tool Show in Paris where a thousand and one European builders showed tools they expect to sell in Europe, in America, and all over the world at prices universally below the costs of American builders. If they compared wage costs in the U. S. with those of foreign countries, they would have found:

American wage rates are three to seven times those of our principal competitors abroad.

We think the weight of the evidence shows that we're confronted by something much bigger than a steel strike. We think all union people should realize that, in effect, they're engaged in a strike against survival—the survival of their own jobs and the survival of America.

Walter J. Campbell

EDITOR

Questions and Answers on METALWORKING MACHINERY

...for those concerned with specifying or buying new equipment

QUESTION: Who is the largest national supplier of metalworking machinery equipment?

ANSWER: Ryerson is the largest by far – offering over 3800 different types and models produced by almost 100 of the nation's leading manufacturers.

QUESTION: What types of machinery does Ryerson offer?

ANSWER: The most complete line available anywhere, including the best type and right capacity for every metal-fabricating job of:

Bending	Forming	Punching	Shearing
Braking	Hoisting	Rolling	Threading
Drilling	Pressing	Sawing	Welding

QUESTION: What advantages do I get by buying from Ryerson?

ANSWER: (1) Widest selection, (2) Unbiased recommendations, (3) Double guarantee: the manufacturer's warranty backed by Ryerson assurance of satisfaction, (4) Greater continuing interest because we also value your steel and aluminum buying potential, (5) A nation-wide organization of machinery specialists backed by 117 years of Ryerson experience in working with metal fabricators and in using much of the equipment in its own steel service operations.

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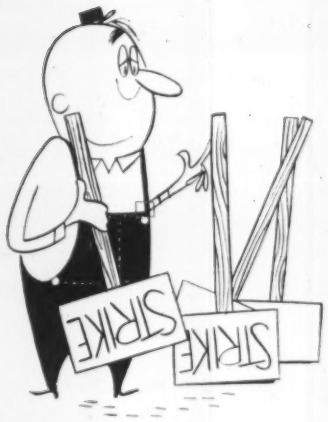
Joseph T. Ryerson & Son, Inc., Member of the INLAND Steel Family

STEEL • ALUMINUM • PLASTICS • METALWORKING MACHINERY

NATION'S MOST COMPLETE SERVICE CENTERS IN PRINCIPAL CITIES COAST TO COAST

How the Picket Signs Will Be Put Away . . .

If Taft-Hartley Is Invoked



LOOK FOR Taft-Hartley to be invoked sometime between Oct. 1 and 15 to get striking steelworkers back in the mills.

The industry and the union are "a million miles apart in negotiations," admits Thomas Patton, president of Republic Steel Corp. Officials on both sides see "little chance for settlement soon."

• **Optimism Vanishes** — Only a couple of weeks ago they were cautiously optimistic as the union agreed to call in subcommittees from the individual steel companies and talk about local working condition clauses. Improvements there would permit some cost savings to offset any gains in wages and fringe benefits that industry might give. The companies' position was and is to prevent any increases in employment costs per unit of product.

But the subcommittee negotiations bogged down. Both sides resumed their public accusations against each other. "The situation is worse than ever," believes one observer.

• **Labor United**—Organized labor is closing ranks to support the United Steelworkers. The AFL-CIO, meeting in San Francisco, voted to begin a drive to raise $28 million a month for the striking union. The convention also renewed labor's demand that the

• If a strike has caused or threatens to cause an emergency, the President may start the Taft-Hartley procedure.

• The President first appoints a fact-finding board to secure statements of all relevant issues. They are made public and the points of view of each party to the dispute are included. (The board, each member of which gets $50 a day, plus expenses, may use any legitimate means to obtain facts. In the steel case, Labor Secretary Mitchell has already gathered the facts. The board could use those, plus each side's statement of its case.)

• When the President is in possession of facts, he can direct the attorney general to go to a federal district court with a petition to enjoin the strike. (In this case, the action will probably be at Pittsburgh because the United Steelworkers has its headquarters there.)

• The court can grant the injunction; in the past no court has refused. The court's decision is subject to review by a circuit court of appeals and the U. S. Supreme Court. (There have been 13 T-H injunctions since the labor law was passed, the most recent in 1957 in connection with a strike against Goodyear Atomic Corp.)

• After the lower court acts on the petition for injunction, the two parties must continue to negotiate.

• If the injunction is granted, the fact finders reconvene and 60 days from the date of the injunction report the current bargaining position. That report is made public.

• After the fact finders make their report, the National Labor Relations Board takes a secret ballot of the union members to see if they wish to accept the final offer made by industry. The vote must be accomplished within 15 days of the fact finders' report.

• Within five more days, the results of the election are certified to the attorney general. (The three periods of 60, 15, and 5 days constitute the 80 days commonly referred to as the T-H 80-day injunction.)

• If the strike begins again after the 80 days, the President submits a report to Congress "together with such recommendations as he may see fit to make." The last step is preliminary to Congressional action to solve the national emergency.

President appoint a fact-finding board to study issues and recommend settlement terms.

Steel companies are against that, and Mr. Eisenhower says he will not take such action unless both sides want it.

• **T-H Remains**—One of the few courses left is to invoke T-H. The USW is opposed, a big reason being the secret vote required to get the men to strike again when the 80-day cooling off period is over (see the accompanying box for an explanation of that T-H feature). Emil Mazey, secretary-treasurer of the United Auto Workers, has gone so far as to tell presidents of AFL-CIO unions that they should order slowdowns if steelworkers are ordered back to their jobs by T-H.

The steel companies aren't enthusiastic about a T-H injunction, either. But the industry's chief negotiator, R. Conrad Cooper, points out: "If the strike is now assuming the potential of harm to the nation, it was for such a situation that Congress prescribed the T-H procedures 12 years ago."

• **Steel Shortage Worsens**—Inventory imbalances will be "very serious" by Oct. 1, says Mr. Patton. Shutdowns for lack of steel are coming with increasing frequency, and we'll be deluged with them by early next month. While all auto companies can keep up their assembly schedules at least through mid-October, some partmaking operations have already been stopped or curtailed, especially in General Motors Corp. plants.

GM's deal to buy 70,000 tons of ingots and slabs from Phoenix Steel Corp. and get them converted to finished products at an $80-per-ton premium is an indication of the seriousness of the situation (for more on steel supplies, see Page 169).

• **Experiment with T-H**—If T-H is used in the steel case, this will be the toughest test yet for that feature in the law. The biggest strikes it has been used for to date have been maritime walkouts. Most everyone expects the injunction to be obeyed, if invoked, but the slowdown threat is ominous.

Obediance—to the letter and spirit of the law—would be to everybody's interest. As Mr. Patton points out, the gross national product in 1960 can hit $500 billion if the strike ends "soon."

Strike Losses

(Through Sept. 28)

Lost Steelworker Wages

---------- **$780,400,000**

Lost Sales

---------- **$2,268,000,000**

Lost Production **(ingot tons)**

---------- **21,515,600**

Other Losses

Overhead, depreciation, and salaries of nonproduction workers in steel.

---------- **$432,000,000**

Tax Losses to U. S.

---------- **$495,000,000**

Labor Pot Nears a Boil for Railroads

THE NATION's railroads have countered labor demands for $750 million in wage raises with a proposal to cut nearly $1 billion from industry payrolls. If a deadlock over wages causes the railroad brotherhoods to strike, the nation's recovery from economic troubles started by the steel strike could be critically delayed.

Although railroad contracts continue from year to year, the contract moratorium on wages and work rules expires on Nov. 1. Then, if federal machinery designed to avert rail strikes breaks down, the unions can serve notice of a strike for early 1960.

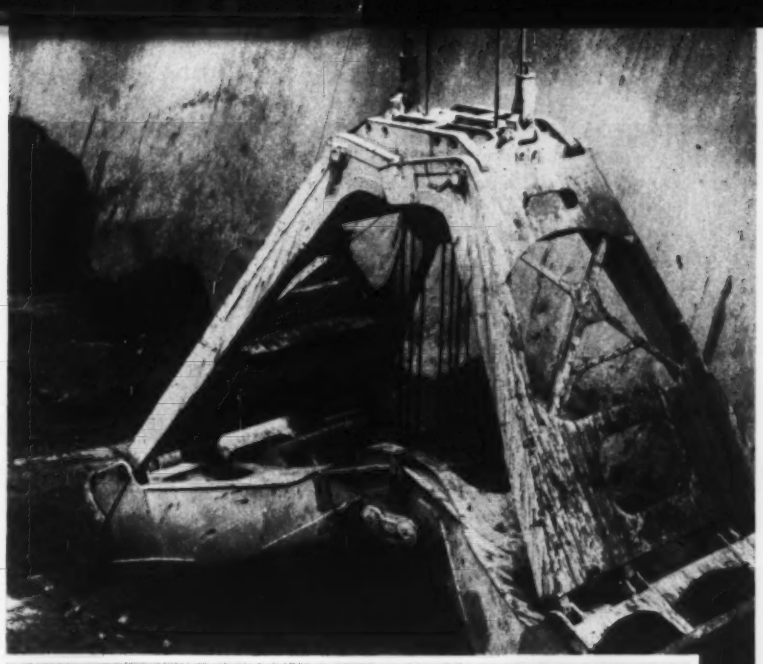
• **Industry conference committees followed up a 15 cent-an-hour-wage-cut proposal made to operating employees last spring with a similar suggestion to 11 nonoperating unions representing 550,000 workers.**

The industry's proposal was offered while executives of the nonoperating unions met in San Francisco to plan bargaining strategy.

Ted Short, chairman of the Western Carriers' Conference Committee, one of three groups which handle wage negotiations for the roads, said the 15 cent wage cut would cancel out gains made by railroad workers since 1953. He said the average straight time wage in the railroad industry increased 31 per cent since 1953. He pointed out that the Department of Labor's cost of living index rose only 7 per cent.

Wages for more than 1.2 million employees in 1953 were reported at $5,381,000,000.

The number of railroad workers had been cut to 1,058,000 by 1956. Mr. Short said average straight time pay for nonoperating personnel was $2.37 in July of this year vs. $2.16 for manufacturing workers.



Steelmen May Scrape Bottom for Ore

(Gross tons)

Stocks at end of	Total (U. S.)	Lake Superior
September, 1956	50,974,181	36,908,198
September, 1957	61,843,964	45,062,520
September, 1958	68,012,807	46,519,756
September, 1959*	47,548,488	39,151,153

*Estimated.

Poststrike Ore Pinch Looms

WILL IRON ORE supplies be adequate to support high level steelmaking operations this coming winter and spring?

Steelmen are becoming increasingly concerned as the steel strike drags toward its twelfth week, and Lake Superior ore shipments are held to little more than a trickle—797,979 gross tons in August vs. 12,987,302 in June, the last full shipping month before the strike.

Some ore and steel authorities think industry can just about scrape through next spring if: 1. The steel strike ends Oct. 1 or thereabouts. 2. Lake vessel operations are quickly resumed. 3. Weather for ore mining and shipping is favorable into December. 4. Labor problems on the local level are rapidly resolved, and a strike of stevedores at eastern ports (handling the bulk of imported ores) is avoided. 5. There's no railroad labor trouble early next year to tie up rail shipments. 6. Shortages of certain grades in the ore mix are few.

• **Stocks Still Fair**—Based on latest statistics, over-all stocks of ore (domestic and imported) at the end of September will be around 47 million gross tons, about equal to those held at the end of June. However, the total is down noticeably from stocks held at the end of September in most recent years (see table).

Of stocks held Sept. 30, it's estimated that 39 million tons were the Lake Superior grades vs. 46.5 million tons a year ago and 36.9 million tons Sept. 30, 1956.

Assuming quick resumption of lake vessel operation if the strike ends Oct. 1 (only 37 ships out of the 243 in the lake fleet were operating Sept. 15), something like 20 million to 25 million tons of Lake Superior ore may be brought down by mid-December, weather permitting.

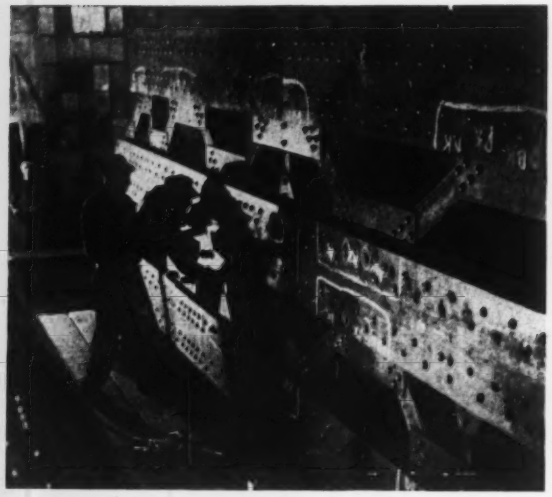
• **Imports Substantial**—It's figured that imports will add 6 million to 7 million tons to stocks in the last quarter, bringing ore availability in the period (stocks of 47 million, plus projected Lake Superior shipments of 25 million, plus imports) to around 78 million gross tons. Deducting estimated consumption of 30 million tons in the last three months of the year, puts stocks around 48 million tons at the start of 1960, enough to assure fairly high steelmaking operations beyond opening of navigation in the spring.

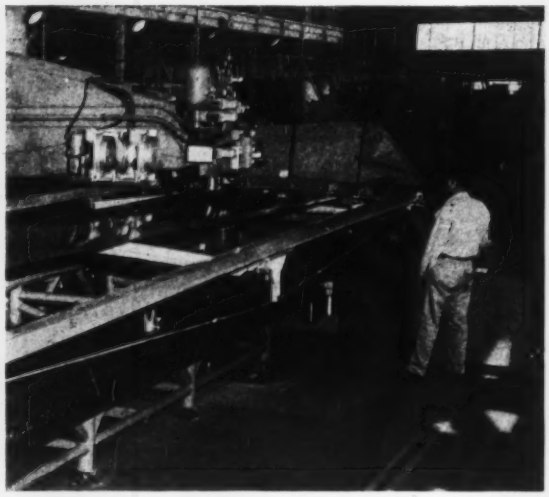
Even under the most favorable circumstances, steelmen expect to be scraping the bottom of their stockpiles of certain grades. (They always have in past years, necessitating considerable trading and borrowing.) Some relief may be afforded by all-rail shipments during the winter months, but such movement is costly and has never exceeded 7.9 million tons in any year.

• **May Use More Scrap**—The steelmakers, of course, may increase the percentage of scrap in their melts. Scrap supplies are plentiful.

But the "ace in the hole" in the threatening ore situation is provided by imports. This year, the foreign tonnage coming into this country will top that a year ago, probably exceeding 30 million gross tons. Foreign ore is being stored in large quantities at coastal and lake ports.

Some time ago, the U. S. Tariff Commission predicted that by 1965 imports will exceed 65 million tons, by 1970, over 85 million, by 1975, over 105 million. In the light of those predictions, American shippers are concerned about the future of their markets. They want to stem the encroachment of foreign ore as far as possible. To be successful, they'll have to get Lake Superior ore moving to the furnaces in large volume quickly.





Use of solid rivets (left) is still important, but tubular types gain with automation as . . .

Rivetmakers Shift for New Markets

RIVETING, long one of the most popular methods of fastening, is faring a little better in the competitive battle for markets.

While the long term downtrend in use of solid rivets is unchecked, general rivet business is up, chiefly because of the high volume of tubular and split types.

Dollar and tonnage figures can't be pinpointed because data are lumped with those of other fasteners. But dollar volume for the over-all fastener industry was up about 41 per cent in the first seven months of this year, contrasted with the pace in the like 1958 period; tonnage was up about 43 per cent.

• Rivets are sharing proportionately in the fastener industry's gains.

Some rivetmakers (many also make other fasteners) say their first half sales of fasteners were up about 30 per cent over those in the like 1958 period, with rivets accounting for about 8 per cent of the total in some cases. The Tubular & Split Rivet Council reported record production and shipments of rivets in the first half.

Improved business was largely due to the general recovery from the 1957-58 recession, but hedge buying against possible shortages attending the steel strike was also a factor. Construction needs have been heavier, and carbuilders' requirements have increased sharply, while general metalworking (notably automotive and appliance) has been taking markedly larger tonnages.

• Rivet use nose-dived at end of World War II when aircraft builders went to welding and the construction industries enlarged their use of bolts and welded members in field erection.

It's estimated that 75 per cent of all steel erection in the field today is done with high strength bolts. Use of rivets in this area is still declining—and prestressed concrete is a growing threat to both rivets and heavy bolts, but the railroads still provide a big market for solid rivets, as does general shop fabrication of structural steel.

Semitubular and other forms of tubular and split rivets that can be automatically fed and set on high speed riveting machines have gained widespread acceptance in assembly.

Interest in riveting is being stimulated by the possibilities offered for automatic operation and assembly. New machines with capacities for setting several thousand rivets per hour point the way for automatic assembly of multiple parts. In the opinion of the Tubular & Split Rivet Council, tubular and semitubular rivets may become the basic fasteners around which automatic assembly machines will be designed in the future.

Some observers estimate present tubular rivet production capability at 80 million to 150 million rivets a day—far higher on an around-the-clock basis.

• Riveting consists of inserting a metal pin through holes in two or more parts, forming over the ends of the pin to secure the parts firmly.

Rivets are driven in both hot and cold condition by hammering or peening, or by application of pressure or squeezing. Automatic equipment feeds the rivets to predrilled stock and heads the rivets, or

punches the material and then feeds and heads the rivets.

Advantages claimed for riveting include: High production rates; low initial equipment costs; metallic and nonmetallic materials can be joined; dissimilar metals and assemblies can be fastened; unskilled labor can be used to operate riveting equipment; rivets can be made of a variety of metals.

Three basic methods are used: 1. Upsetting a rivet with a pneumatic hammer and bucking bar. 2. Setting a tubular and bifurcated rivet on a bench or floor machine. 3. Blind riveting, using special fasteners. (This method has grown rapidly in recent years.)

Generally, classifications are: Large, solid rivets (½ in. and larger), used in construction of buildings, bridges, boats, boilers, and similar structures; small, solid rivets (3/32 in. through 7/16 in.), used in assemblies where shear and tensile loading may be high—important markets are the automotive and farm implement industries; semitubular, full tubular, and split rivets, used in automatic setting machines for applications where they are subjected to shear rather than tensile stresses, or where either of the stresses is negligible.

• Since riveting is a basic form of joining in a wide variety of growth industries, demand prospects are considered highly promising.

Here's how the Tubular & Split Rivet Council sees the outlook: "If projections hold true, rivets will have run the gauntlet from the most popular fasteners to a less important role, then back again." That may be an overoptimistic view, but there's little question about encouraging gains, even though the volume of some makers, particularly of the solid types, isn't back to prerecession levels.

Marketing problems are largely confined to domestic business because rivets play only a minor role in foreign trade.

In general, the rivetmakers have enough steel and rivets in stock to satisfy demand well into the fourth quarter. Makers of tubular and semitubular grades and specialty cold headed fasteners have sufficient raw materials to carry them at close to peak production for 60 to 90 days.

West Gets New Steel Plants

Zeckendorf Steel Co. is formed to produce reinforcing rods and merchant mill products in Arizona and Montana. Iron will be recovered from copper slag by the Strategic-Udy process

PLANS to build steel plants in Arizona and Montana, to exploit iron bearing slag from copper smelting, are announced by William Zeckendorf, New York real estate developer and financier. Companies organized by Webb & Knapp Inc. (Mr. Zeckendorf's firm) and Strategic Materials Corp. will build and operate the plants.

Recovery of iron from slag left at abandoned copper smelters and from hot flux turned out in copper refining should be profitable, say steel industry metallurgists. Plentiful raw material, a local market for the steel produced, and absence of major metallurgical problems should help such an operation pay off.

Strategic Materials will turn over exclusive world-wide rights to use its Strategic-Udy process on copper slags to Webb & Knapp Strategic Corp. It will receive a 15 per cent equity interest in the new company. Webb & Knapp Inc. will own 85 per cent of the stock. Steel plants will be operated by Zeckendorf Steel Co., a Webb & Knapp-Strategic subsidiary.

• Molten slag, with copper and zinc removed, is made into semisteel, then refined further in a conventional steelmaking furnace.

Copper slag is melted in an electric furnace with other materials (coal, lime, and reducing agents). One of the agents removes most of the copper and carries it to the bottom of the furnace. It's later recovered. A large portion of the zinc comes out of the boiling slag as fumes and is recovered from waste gases.

Iron bearing slag is then made into semisteel in a second furnace. Further refining in a conventional steelmaking furnace yields a product that meets standards of the American Society for Testing Materials.

• Slag piles should last 30 to 60 years. More of the material will be obtained from active smelters.

One of the plants will recover iron from slag at an abandoned copper smelter at Clarkdale, Ariz., and convert it into steel. Koppers Co. Inc., associated with Strategic Materials Corp. in developing plants to use the Strategic-Udy process, is doing preliminary research and engineering for a steel mill at Clarkdale. The plant, to be built on a 1200 acre site at a cost of $15 million, will be in operation in about two years.

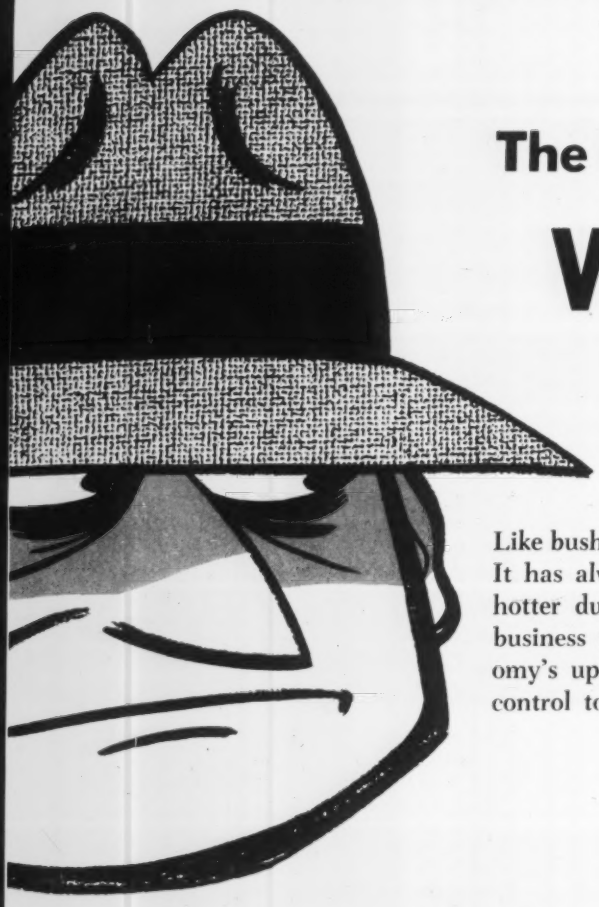
Clarkdale slag contains 33 per cent iron, 0.5 per cent copper, and 2 per cent zinc. It will take 3 tons of the material to produce 1 ton of iron. The slag pile (about 30 million tons) is expected to last 30 to 60 years, depending on the plant's production rate. Phelps Dodge Corp. stopped working the Clarkdale mine in 1953. After six years, it was acquired by Webb & Knapp.

Another slag pile—about 40 million tons—is to be purchased from the Anaconda Co., Anaconda, Mont., by Webb & Knapp, and resold to the steel company. A steel plant is to be completed in about four years at the Montana site. The smelter there is active; that insures future availability of slag. Use of the hot slag will make for better efficiency.

• Location of the plants will insure a local market for steel and other products.

The integrated plant at Clarkdale will make concrete reinforcing rods and other merchant mill products. Initial capacity will be 500 tons a day; that can be boosted to 1000 tons a day as demand increases.

Controlled slag residue from the process will be used to make insulation and lightweight aggregates for concrete building products. The company will turn out 1000 tons of building materials a day.



The Case of the Vanishing Profits

Like bush warfare, price fighting is easy to start and tough to stop. It has always been with us to some extent, but the fray grows hotter during recessions. It flared up sharply during the 1958 business troubles. And it's still going strong, despite the economy's upsurge. Here are suggestions on how to bring it under control to recover those vanishing profits

"I CAN'T understand it. I'm not making any money even though I'm working near capacity."

That was the fifth time my prospective client had made that statement. The first instance had been over the telephone that morning when he had called for an interview. I had set a date for the afternoon, at the expense of seeming too eager. But I, Acton Chance, industrial detective, wasn't making any money either because I was working at far below capacity. No wonder I was as disturbed as my visitor to learn about profitless prosperity.

My client (for I decided to take his case as his story unfolded) said he came to me because of my work in similar puzzles—the Case of the Vanishing Jobs (STEEL, Apr. 6, p. 99) and the Case of the Vanishing Taxes (May 11, p. 100).

"Call this one 'the Case of the Vanishing Profits,'" the client said wryly. He related how he was a supplier of parts to the appliance, automotive, and machinery industries. He had modern equipment; the wages he paid were competitive; he made a good product.

"But I can't sell it at a profit." He ran his fingers through his sparse hair. "To get business, I must be competitive pricewise. And I can't meet my competitors' quotations and make money. What's the matter? And what can I do about it?"

To learn the answers to that double-barreled question, I checked with hundreds of metalworking companies. Finally, I had my facts, and this is my report:

Some 62 per cent of metalworking's managers report that price fighting is the toughest problem they face. For them, it outranks in seriousness the next five worst difficulties—union pressures for wage increases, inflation, stifling taxes, inadequate depreciation allowances, and foreign competition.

Despite a rapid recovery from the 1958 recession, we're still struggling with the problem.

"Price cutting is the rule rather than the exception in our field," says a tool and die maker.

"We're still seeing plenty of panic bidding," says a stamper.

Nineteen of twenty makers of material handling equipment admit price fighting is still prevalent.

"It's terrifc on the smaller jobs," say manufacturers of electric furnaces.

Some 65 per cent of casting-makers report active price fighting. One of five thinks it will worsen before the year's out.

No honest businessman wants price collusion, but price suicide is another matter. Says a machine tool builder: "Price cutting based on genuine cost reductions is good for the economy, but price wars are as harmful as price fixing."

"We are not going to get anywhere just by cutting prices," says Roy C. Ingersoll, chairman of Borg-Warner Corp. "Once we know our companies are operating and producing efficiently, it is our responsibility to sell our products at prices fair to the public, to our distributors and dealers, to our competition, and to ourselves."

What causes price wars? A look may reveal some of the remedies.

A major cause is ignorance. A crane manufacturer reports: "The low bid on a job I was interested in was 5 per cent under my own *costs*. I know the competitor's plant and his wage levels. I think he must be losing money on the job, but he claims he isn't. I believe he doesn't know his true costs."

H. T. McAnly, resident partner in the accounting firm of Ernst & Ernst, points out: "Good cost accounting systems are still lacking in many companies today. Because they don't know their true costs, some firms are unwittingly sending part of their capital out the door with every shipment."

Price fighting is more prevalent in bad times than it is in good times. The marginal firms that do all right in fair weather clutch at straws when the going gets rough. One of the obvious straws is price.

Much of the destructive price cutting going on today is a holdover from the 1958 recession. Like an armament race, a price war is easy to start, difficult to stop.

A third cause is related to the bad-times concept. Foreign goods are coming into the U. S. increasingly, and their attraction is usually a dramatically lower price than that of their American counterparts. Some U. S. manufacturers are often trigger happy when it comes to shooting the price gun, so another skirmish starts.

The fourth major reason is economic ruthlessness. A purchasing agent may play one supplier against another. A big, well established firm may seek to get into a new field and be willing to take a loss for a while to gain a foothold.

Or the ruthlessness of economic events may cause panic price cutting. Through accident or miscalculation, a company may be forced to dispose of its stock at a loss.

Those are the causes. What can you do about them?

The major weapon, many experts agree, is better cost knowledge. "I wish that my competitors knew their costs as well as I know mine," laments a maker of screw machine products.

Trade associations can and do perform a vital service here. For more than 30 years, the Gray Iron Founders' Society has sponsored local cost groups to study and compare costs. Group members send the group cost consultant a record of their average costs for the preceding quarter. The consultant prepares a comparison. Each foundry's costs are listed under a symbol (company names aren't disclosed). Each member gets a copy of the comparisons which enables him to locate high cost items.

To minimize price fighting resulting from lack of business, the steel industry has found it helpful to emphasize factors other than price in competing. "In fact," points out one executive, "price is one of the poorest competitive tools. Anybody can meet your price. Not everybody can match your engineering, quality, or service."

And remember that price may not be as important with purchasing agents as you think. During the price wars of 1955 that followed the 1954 recession, the American Gear Manufacturers Association cited a survey of 100 lost customers. Only nine dropped their old supplier because of price. Far more important, 68 drifted away because of supplier indifference; 14 had unadjusted grievances; five bought elsewhere because of the influence of friends; three moved; one went out of business.

Comments a purchasing man for Thompson Ramo Wooldridge Inc.: "A man who buys solely on price sooner or later will be burned."

And a price cut is not a guarantee that volume will rise. A maker of wire rope says: "Price fighting in 1954 didn't increase our over-all volume an iota." He advises: "Talk price, but talk about it last."

Another remedy for price fighting is courage. Listen to this machine tool company president: "The greatest pressure on me to cut prices comes from my sales manager. Once you establish a policy of no price fighting, stick to it."

Advises a steel warehouseman: "Ignore the action when a marginal outfit cuts price or somebody has a distress sale. That kind of volume probably accounts for less than 1 per cent of total business and isn't worth worrying about."

A foundry president recovered a lost account when the customer discovered that the new supplier's reject rate was triple the old pace, boosting costs above the old price.

Profit is the key to the whole question of price cutting. If your profit is fair and your costs com-

To Minimize Price Fighting . . .

1. **Know your costs; encourage your competitors to know theirs.**
2. **Emphasize quality, service, delivery, and engineering more than price.**
3. **Have the courage of your pricing convictions; don't yield to internal or other pressures to cut.**
4. **Ignore price cutting by marginal firms or those in distress.**
5. **When you can't ignore price cutting, point out to customers the true cost of low prices.**
6. **Beware of price cutting rumors.**
7. **If you must talk price, talk about it last.**

petitive, you can ignore price cutting. It's caused by special and temporary conditions.

But your costs must be competitive. Somebody may come along with lower costs, as so many foreign producers are now. The steel firms took a strike to prevent their labor costs from getting even farther out of line with foreign levels.

Plastic pipe doesn't cost as much to produce as the competing kinds of steel pipe. Several steel firms started to make the plastic product to compete on costs. That's real competitive price cutting and is natural and desirable in a free market.

As part of this cost matter, you must also make up your mind about the quality and service you will deliver. As John Ruskin puts it: "There is hardly anything that some man cannot make a little worse and sell a little cheaper, and the people who consider price only are his prey."

That ended my report.

I put the *Barlett's Familiar Quotations* away, rather pleased with the Ruskin bit. A glance at the clock showed it was time for my 4 p.m. bourbon, but I hesitated. Would John Ruskin approve? And this whisky was expensive. What about my own costs?

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

U. S. vs. Japan in Transistors

ELECTRONIC Industries Association (EIA) has answered Japanese competition in transistors and other semiconductor products (including diodes and rectifiers) by asking the Office of Civil & Defense Mobilization to investigate imports.

• **Section 8 Case**—Under Section 8 of the Trade Agreements Extension Act, a U. S. manufacturer is entitled to request such a study if imports are "in such quantities as to threaten to impair the national security."

EIA argues that the imports will lead to "inevitable curtailment of future research and development."

• **Military Market**—The Electronic Production Resources Agency of the Defense Department recently estimated that shipments of transistors to the military will increase ten times today's rate by 1965. The EIA reasons: Domestic firms must expand their facilities to meet that demand. Yet without a continuing civilian market, they will lack the funds to do so.

• **Japanese Move In**—About 50 per cent of the industry's sales are to civilian markets. The EIA petition is in terms of transistors and other semiconductors imported separately, or contained within end products, like radios.

The Japanese must pay a 15 per cent duty, yet they are still able to beat U. S. manufacturers' prices by a substantial margin. The high quality of work required in transistor production means plenty of hand labor. Low Japanese wages make low prices possible. In some cases labor costs may run one-fifth of what they do here. Prices are scaled accordingly.

For example, the Japanese sell an entertainment type transistor in this country for 80 cents. A U. S. maker must charge $1.35.

• **The Statistics**—Japanese transistor production rose from 560,000 units in 1956 to 26.7 million in 1958, and 80 million units are expected to be made this year. Diode production has grown from 1.4 million in 1956 to 10.1 million units in 1958; first quarter production this year was 5.3 million.

U. S. transistor production has grown at a much slower rate: From 12.8 million units in 1956 to 47.1 million in 1958.

While 20 per cent of the Japanese radios reaching the U. S. are re-exported to South America, they are hurting U. S. makers—105,000 radios were imported in '57, 1.2 million in 1958.

About 60 per cent of the transistor production in Japan this year is destined for shipment to the U. S.

• **The Procedure**—Those interested in filing a statement on the EIA petition must notify OCDM within 30 days. The statement must be in the hands of the agency in another 25 days. Rebuttals may be made in another 30 day period. OCDM may take up to a year to reply.

We're Losing Tool Capacity

THE U. S. machine tool industry is moving part of its capacity overseas.

The National Machine Tool Builders' Association says the flight of U. S. capital has been triggered by the lure of cheap labor and, to some extent, more favorable tax policies. Alarmed over the trend and other factors creating an unfavorable business climate, NMTBA is calling the Office of Civil & Defense Mobilization's attention to developments in what might be the beginning of a campaign to secure mitigation. The association has not applied for relief under Section 8 of the Trade Agreements Act. Such action probably depends upon the response to its preliminary complaint.

• **Survey Cited**—The association revealed to OCDM the results of a survey taken among the trade group's 124 members. In terms of volume of members making cutting and forming machines, 54 per cent of the U. S. machine tool industry has or is planning arrangements to produce machine tools abroad. (Thirty-nine companies with 43 per cent of U. S. capacity have such arrangements; 20 additional firms are planning such moves.) In numbers of companies, 47 per cent of

those responding have or are planning to make tools overseas.

In terms of volume, 63 per cent of the U. S. cutting type machine tool industry has or is planning foreign agreements.

• **Further Losses**—The association said that if domestic machine tool builders expect to retain their competitive position in both foreign and home markets, diversification in other precision metal products appears the only alternative. It pointed out that quite a few firms have already embarked on that course resulting in an additional loss of our machine tool capacity.

• **Danger Apparent**—The overseas movement reduces over-all capacity on this continent as well as reducing jobs available to American labor, the association continued. It also strengthens the potential war-making ability of the Soviet Union. If Russia were to overrun Western Europe, it would gain control of the powerful industry there and our own transplanted capacity.

Industry's migration includes the exporting of our latest developments in research and knowhow, the association continued. Result: Increased foreign production and even lower costs and prices causing fresh inroads on our domestic and overseas market to create a new spiral to threaten our security. The decline of U. S. sales and profits also means less working capital for research and development.

The association emphasized that these facts, together with the drop in exports and rise in imports, show the exodus of U. S. capacity to be a serious threat to U. S. security.

If the same thing were happening in our aircraft and missile industry, it would be plain for all to see, the association asserted. Machine tools are less dramatic than airplanes and missiles, but the danger is no less significant, it added.

• **Situation Worse**—The NMTBA study indicates an even greater migration of industry than did STEEL's survey of machine toolmakers (May 25, p. 96) which reported 25 per cent of U. S. firms having foreign capacity and another 16 per cent planning overseas operations within a year.

Says U.S. Is First In Instrumentation

THE U. S. produces more instrumentation than any other country, Henry C. Frost, president of the Instrument Society of America, told members at the opening of their instrument-automation conference at Chicago last week.

Mr. Frost, who is manager of administrative services, Corn Products Co., New York, said: "Soviet scientists have been the first to shoot a rocket to the moon. For this we applaud them. We may expect them to score other firsts in space. These, also, we shall applaud. But Soviet space instrumentation is produced on a laboratory scale."

He added: Only the U. S. can produce sufficient instrumentation to push ahead with our balanced space and nuclear programs and improve the world's highest living standard with further industry automation at the same time.

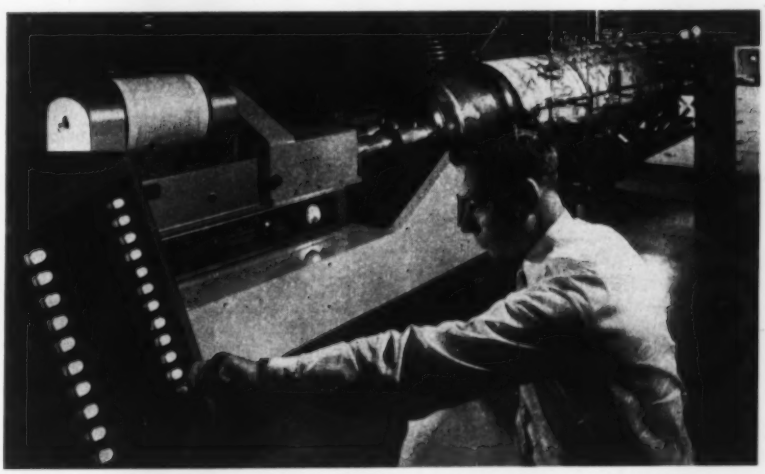
• **Scope**—Conference subjects ran from instrumentation related to the conquest of space and computer control of industrial processes to instrumentation for highway construction. Analysis of continuous chemical processes and other instrument problems of around-the-clock production occupied much conference time. Attention was also paid to such other significant questions as how to keep the U. S. from falling behind the world in capacity to make fundamental scientific measurements.

• **The Exhibits** — Instrumentation equipment exhibited ranged from relatively simple gages and measuring devices to thermometers which record high surface temperatures of materials without contact, and a machine which processes data at a rate of 10,000 samples a second.

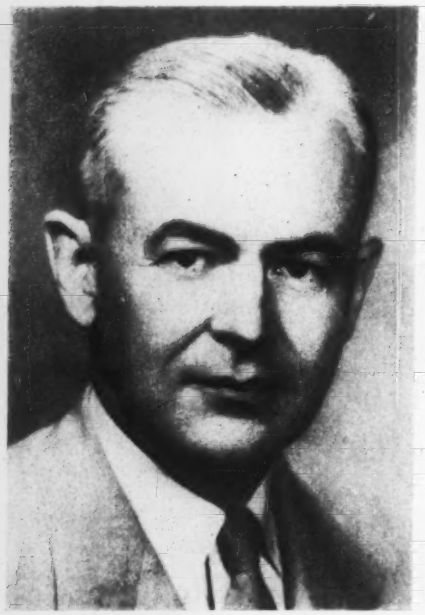
Alcoa Talks Recess Again

Negotiations in New York between the United Steelworkers union and Aluminum Co. of America have been recessed until Oct. 6. No reason was given. The union and the company had resumed discussions Sept. 21 after a three-week recess. Officials report the talks centered on noneconomic issues.

The steelworkers' contract with Alcoa expired July 31, but was extended for 90 days or until a steel settlement, whichever is first. The union wants a 15 cent an hour boost in wage and fringe benefits—about the same economic gains asked of the steel companies.



WITH THIS LONG PATH INFRARED CELL, assembled by the Fuels & Lubricant Dept., General Motors Research Laboratories, Warren, Mich., chemists hope to learn more about the complicated chemistry of smog formation. Mixtures of nitrogen oxides and various hydrocarbons found in the atmosphere are irradiated with artificial sunlight to determine what photochemical reactions are involved



Resigning Pentagon Comptroller McNeil predicts...

Defense Spending to Hold

ANY government official's swan song is worthy of your attention because he is always tempted to pull out all stops. Case in point: Wilfred J. McNeil, outgoing comptroller of the Defense Department, is an outspoken Scot who has served since the department was organized. He knows more about the defense labyrinth than any other man who ever served there.

Talking to newsmen before leaving to become president of the Grace Line Inc., he made these predictions of Pentagon policies for the next three fiscal years (1961-63): 1. Defense spending will probably hold at the current $41 billion annual level. 2. Inflation of defense costs will be absorbed within that figure. 3. Perhaps 100,000 men will be cut from the service's payrolls.

Manpower Competes with Weapons

Speaking of possible economies to be gained from the switch to missiles from aircraft, Mr. McNeil notes a B-52 bomber costs $1500 an hour to fly (including fuel, spare parts, maintenance, and overhaul costs). An intercontinental ballistic missile on a launch pad costs a fraction of that.

A 100,000 manpower cut could save Uncle Sam $500 million. Thus he predicts a stable budget, even though inflation may boost costs 1 to 2 per cent a year. Decreased maintenance costs for missiles and the manpower savings could cover a $400 million to $800 million inflationary hike with little trouble, he believes. A third form of economy is possible if Defense Secretary Neil McElroy carries out his intention of eliminating "marginal" weapon systems.

Noting the Congressional tendency to resist manpower cuts, Mr. McNeil said: "People are in competition with weapons. And the cost of people is going up each year. Re-enlistment rates are increasing, and military families are getting bigger, boosting allowance payments. Some shudder at the mention of a manpower cut, but I feel the trend is downward . . . the joint chiefs of staff will decide to put their money into long range procurement to modernize their forces, rather than into operating strength."

R&D Emphasis Will Continue

Reading Mr. McNeil's words closely, and taking into account the possibility of modest disarmament if the cold war thaws a bit, you must conclude that the tendency toward faster development of new weapons, with decreased attention to production of currently operational weapons, will continue for years. The only hitch in that schedule is Capitol Hill's sometimes irrational preference for particular weapon systems.

It behooves metalworking firms to place greater emphasis upon developing better weapons, instead of advocating ever larger contracts for systems which are obsolete as soon as available. Mr. McNeil, obviously aware of the dangers of disarmament, is trying to find a middle ground where the country is "quietly strong," without having to increase its defense budget in proportion to the gross national product.

Ultimately, More Money for Metalworking

No one is saying, least of all Mr. McNeil, that defense firms should retrench. Rather, they must sharpen their efforts to take advantage of as many economies as possible. The firm giving the best service to the Pentagon under the new concepts of defense technology will ultimately gain the most.

If the manpower cuts go through and the switch to missiles pays off in decreased maintenance costs, there will be even more money for metalworking in the defense budget—that is, for the firm willing to leapfrog into new technological areas.

Tankermen Take Plea to OCDM

Another industry has put in its bid to the Office of Civil & Defense Mobilization for relief from foreign competition (see Pages 84, 85). Twelve steamship companies and eight maritime unions (the Joint Committee for American Flag Tankers) report the American fleet is on the verge of extinction. About one-sixth of the U. S. tanker fleet is not being used, they claim. They reportedly want at least half the oil imported into the U. S. to be carried in U. S. bottoms. Only about 2 per cent comes in U. S. tankers now.

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RM-74

CLAD REX 9C

How to assemble piece parts made of CLAD-REX®

Piece parts made of Clad-Rex vinyl-metal laminates can be assembled much like any *un*finished sheet metal parts. No costly retooling or complicated, special techniques are required. However, the few limitations that do exist should be considered with initial planning.

Mechanical Fastening

Mechanical fasteners are as practical with Clad-Rex piece parts as with *un*finished sheet metal parts. The same considerations apply for selection of fastener type and production method. However, piercing or blanking is most suitable from the vinyl side of the laminate. Where both sides of the piece part are vinyl laminated, the thicker vinyl should be exposed to the cutting tool.

Mechanical interlocking by bending, crimping, or any standard lock seam technique is practical.

The resilient vinyl surface of Clad-Rex offers unusual opportunity for fastening with extruded metal devices. Decorative appeal and functional needs can be combined with simple assembly procedures. Extruded teeth within the gripping channels will satisfy most structural requirements. Where extra joint strength is required, dimpling is usually sufficient.

Adhesive Bonding

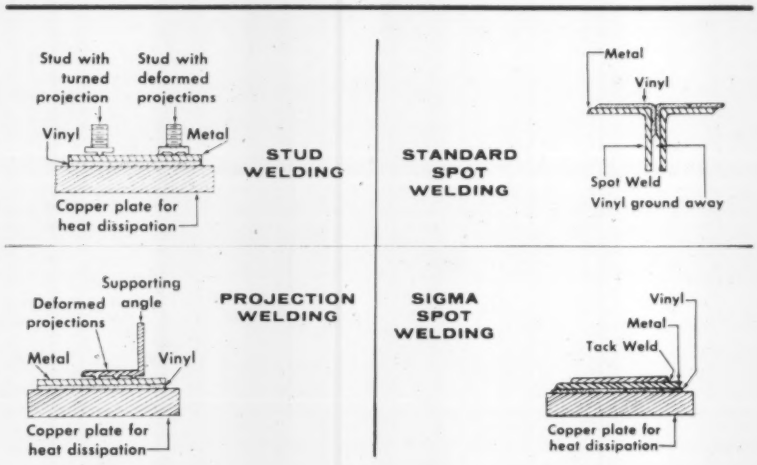
The heat limitation of vinyl-metal laminates must be considered here. Particularly when using adhesives that require heat (or heat and pressure) for curing.

Clad-Rex with an embossed vinyl surface will withstand temperatures approaching 250° F without loss of embossed texture. Where pressure is required in addition to heat, the limit goes down proportionately.

Clad-Rex with a smooth vinyl surface will accept approximately 30% higher heat.

Such other adhesives as the contact or mastic types present no special problems. When using adhesives that require time for curing, clamps can often be eliminated by using interlocking design or resistance weld tacking.

Generally, vinyl-metal laminates in the flat are more tolerant to heat than formed or deep drawn shapes. However, because of the many variables, each bonding application should be considered on an individual basis.



Welding

The heat limitation of vinyl-metal laminates makes some forms of welding impractical. Particularly where the weld area is an exposed finish surface. Only those welding methods that sharply localize and limit the spread of heat are successful. Fusion welding is limited to sigma spot or similar types.

The heat factors combine with the electrical resistance of vinyl to limit resistance welding procedures. Resistance type stud welding is practical. Conventional spot welding is practical where the vinyl surface can be removed with wire brushing or stripping. Where the weld area is opposite a vinyl surface that will be exposed, resistance welding equipment must be tooled for indirect series or parallel techniques (both electrodes on metal under-surface). If the joint has only a minimum of structural requirement, spot welding can be used.

However, where greater structural requirements do exist, only projection welding techniques are suitable. Because all projections must "set down" at once, this limits the size of one of the piece parts to be joined. The projection welding equipment must be capable of (1) very short weld times and (2) extremely fast follow-up of forging pressure.

Generally, there are many variables in resistance welding. Each application must be considered individually. As in all resistance welding, individual imagination in the use of technique and equipment is limited only by the specific requirements of surface finish and weld strength.

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Clad-Rex interest in helping you extends into your own plant. A Clad-Rex Fabricating Engineer is provided to show your production people how easy it is to process Clad-Rex. Furthermore, Clad-Rex operates a fully staffed and equipped research laboratory. Its facilities are devoted to customer service as well as improving Clad-Rex products.

Write and describe your product. See how Clad-Rex can work its broad effect on your manufacturing methods and costs. No obligation, of course.

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1960: 12½-15% Sales Boost

Delegates to the National Industrial Conference Board marketing conference hear sales predictions for machinery and equipment, chemicals, and nonferrous metals

SALES OF machinery and equipment will jump 12½ to 15 per cent next year, Stuart H. Smith, vice president-sales, SKF Industries Inc., told the Seventh Annual Marketing Conference sponsored by the National Industrial Conference Board.

With business on the upswing, alert management is seeking ways to make the most of sales advantages opening up.

The conference, held Sept. 16-18 in New York, explored the theme, "Better Profits Through Better Selling." The meetings were divided into three sections: Sales planning, sales management, and marketing research.

• **Autos to Help**—Big factor in the coming boom, said Mr. Smith: Production of about 6.3 million passenger vehicles and 1.3 million trucks next year.

Mr. Smith anticipates general industrial machinery and metalworking equipment will equal 1956 levels by mid-1960. He told the group that sales of internal combustion engines, turbines, and airborne and electrical equipment are expected to rise 15 per cent. Outboard marine engines will ride another tidal wave of popularity as they did this year.

Farm equipment should increase 5 per cent, he continued, with tractors outpacing implements. Office machinery will climb 7½ per cent. He expects 85,000 railroad freight cars to be built in 1960 compared with 65,000 this year.

• **Caution**—Mr. Smith doesn't believe all firms will snag a share of the boom. The 1960 market will be extremely competitive, he warned.

Allan B. Clow, vice president-marketing, American Cyanamid Co., New York, said chemical sales should top $28 billion, $2 billion above the 1958 figure.

• **Nonferrous Up, Stable** — Commenting on the nonferrous market, Charles B. Ince, vice president and general manager, St. Joseph Lead Co., New York, said that deliveries of refined copper to fabricators may climb to about 1.65 million tons next year. That's 15 per cent above the estimated 1.5 million to be shipped this year. Mr. Ince thinks prices will remain stable as no shortages are expected in 1960.

Lead, after recovering nicely from last year's recession low of 986,000 tons, is now running about 90,000 tons a month for a 15 per cent boost. Mr. Ince predicts a 2 per cent gain in 1960.

Zinc consumption will rise 8 per cent, predicted Mr. Ince. He said both lead and zinc should average above current prices of 12 to 13 cents, while import restrictions coupled with increased demands should make for a firmer market.

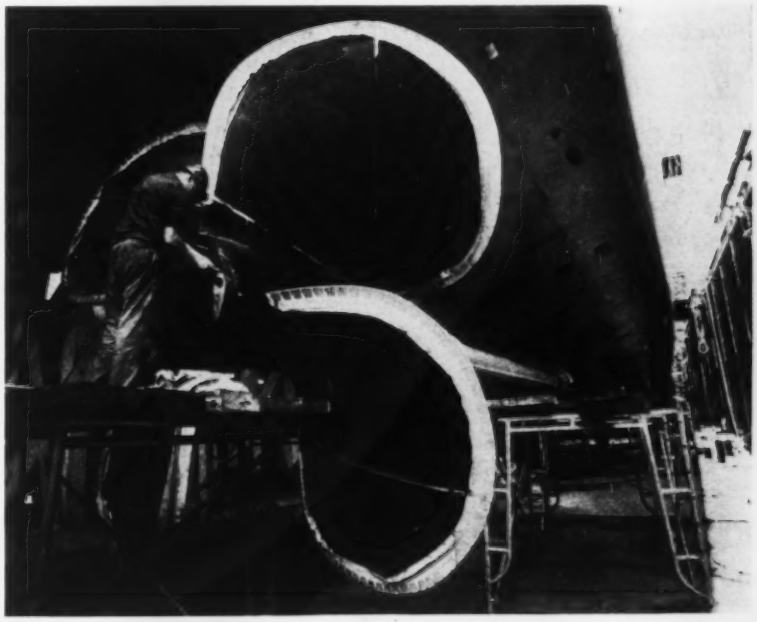
Mr. Ince added that the outlook could easily be changed if the present steel and nonferrous strikes are unduly prolonged.

Astro Nabs NASA Contract

Astro Metals Corp., Hawthorne, N. J., has received a $100,000 research contract to study the feasibility of fabricating high temperature refractory metals into space vehicle components. The contract (from the National Aeronautics & Space Administration) comes on the heels of Astro's development of the first successful method for welding refractory molybdenum metal "sandwich" structures.

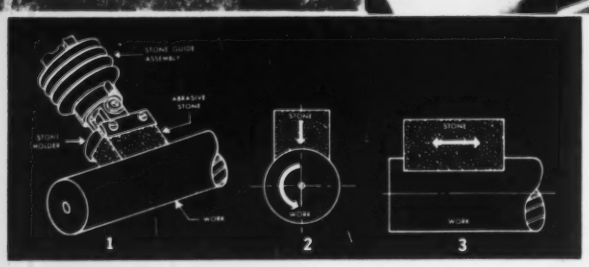
Aluminum Output Upped

Production capacity for spooled aluminum will be tripled by All-State Welding Alloys Corp., White Plains, N. Y. New spooling machines are being added to the White Plains and South Gate, Calif., plants. The company can spool (1 and 10 lb) every type of aluminum used for welding.



ATOMIC POWER WILL DRIVE THIS PROPELLER. It's one of two that will be installed in the cruiser **Long Beach,** the Navy's first atomic powered surface ship. The cruiser is 721 ft long, has a 73 ft beam, and displaces about 14,000 tons. Bethlehem Shipbuilding Div., Bethlehem Steel Co. is designer and builder of the ship. The reactor plants are the work of Westinghouse Electric Corp.

There's a NEW word in metalworking...



How Microstoning Works . . . (1) Supfina Attachment mounts quickly on lathe tool post. Pressing pushbutton valve extends stone guide, brings abrasive stone into contact with work. (2) Due to bonding material, stone quickly conforms to shape of workpiece. Constant downward pressure on stone maintains uniform abrading action and produces a controlled micro-inch surface finish. (3) As work rotates, stone is oscillated parallel to the work axis. Lathe power feed carries the stone the full length of the work. Typical applications include: roll finishing, bearing surfaces, machine tool spindles, guide pins, piston sealing rings, precious metal rolls and electroplating preparation.

Taft-Peirce SUPFINA produces

Here is metalworking's biggest breakthrough in twenty-five years of finishing improvements . . . the new Taft-Peirce Supfina machine tool attachments, originated in West Germany and developed and manufactured by Taft-Peirce for exclusive sale in this country.

So remarkable are the results that a new word had to be coined: "Microstoning." Microstoning is an abrasive final finishing process that generates a *controlled* micro-inch finish on practically any material and at the same time corrects geometrical errors caused during previous machining.

Completely versatile and easy-to-use . . . Taft-Peirce Supfina attachments can be used on all machine tools with-

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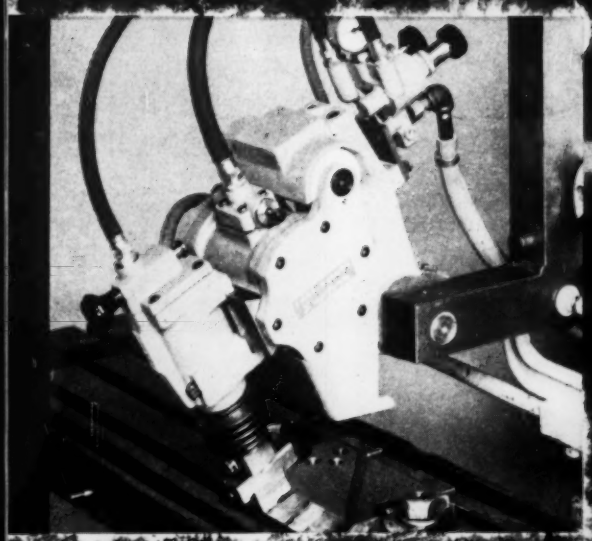

TP 9-13

revolutionary V *controlled micro-inch* surface finish and geometric correction

out modification and can be operated in any position by using standard mounting bars. Set-up is quick and easy.

Low in price, minimum maintenance . . . Because Taft-Peirce/Supfina is a machine tool attachment, your first cost is small. And Supfina has been ingeniously designed for trouble-free operation.

Many savings opportunities . . . Supfina does its job extremely fast. Final finish can be attained in a matter of minutes, and there are many short-cut possibilities, such as elimination of surface grinding, salvaging of rejects, simplified geometrical correction and the unique opportunity to improve product quality without increasing costs.

Find out about Microstoning and Taft-Peirce/ Supfina, now! No matter what your present finishing system is, you should investigate the dynamic breakthrough of Microstoning and Taft-Peirce Supfina. Call or write for complete information. Taft-Peirce Manufacturing Company, 25 Mechanic Avenue, Woonsocket, Rhode Island.

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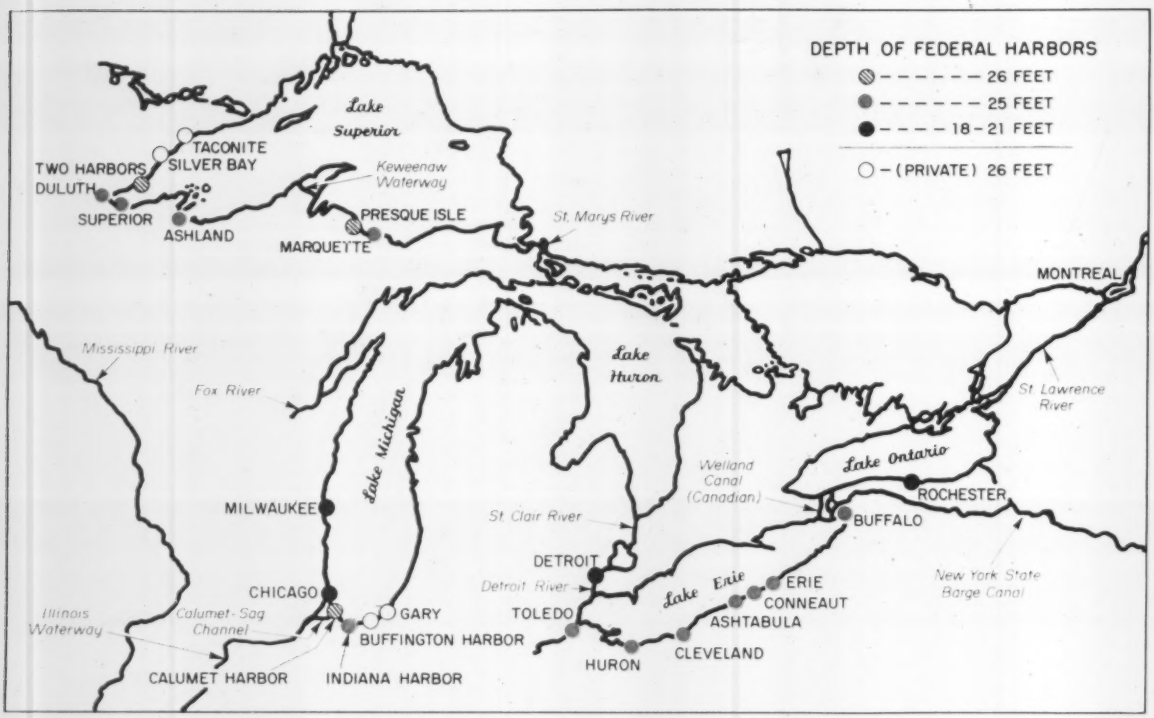

St. Lawrence Seaway: Boon or Bane?

HAS THE St. Lawrence Seaway lived up to its rave notices?

Traffic through the St. Lawrence River (Montreal to Lake Ontario) thus far in the 1959 shipping season is nearly 50 per cent higher than it was in the same period last year. Wonderful, say observers, but it's only half what some people predict.

A port official responds: "Maybe some of us are disappointed. However, we should realize the full effects of the seaway cannot be expected to be felt right away. We've got to educate the people. Firms, especially on the fringe areas, won't change their shipping habits overnight."

• **Too Small?**—Several sources suggest that the seaway may have been underbuilt and that some port facilities are wholly inadequate. Ships have been held up for more than a day waiting for dock space. And the Welland Canal bottleneck is notorious.

N. R. Danielian, president of both Great Lakes-St. Lawrence Association and International Economic Policy Association, says at least $500 million must be spent within the next 10 to 15 years to remedy the situation. ($517 million has already been spent). The bill will be split by the U. S. and Canada.

• **Breakdown**—About $250 million should go toward improving the linkage between the Great Lakes. About $100 million is needed for work in the Detroit and St. Marys Rivers. Another $150 million is necessary to widen and deepen the Welland Canal. More locks are needed to boost the canal's capacity. Only 13 or 14 ships can now be handled each way daily.

The tab for doubling the number of Seaway locks will be $150 million. An additional $100 million must be spent for harbor improvements. Major harbors should be at least 27 ft deep.

• **Work Started** — The Canadian government plans to increase the potential capacity of the Welland by 25 per cent. The move includes the construction of an additional 7000 ft of tie-up walls to reduce the time locks stand idle awaiting the arrival of a ship. The new walls should be finished by next year. Estimated cost: $7.5 million. Work is also underway to deepen the channel to 27 ft.

• **New Type Foreign Aid?**—Some sources fear the seaway will be of greatest benefit to foreign interests. This year's statistics don't dispel their anxiety. Upbound traffic is up 77 per cent, while downbound traffic is only 32 per cent over 1958's.

A foreign trade commissioner says the seaway permits foreign marketers to penetrate the Midwest, one of the richest markets in the world. Mr. Danielian believes the previously self-sufficient region must make some painful adjustments in

Goods are unloaded at Toledo, Ohio, one of many ports preparing for traffic

St. Lawrence River Traffic Up 49%

Although it has been in operation only five months, you already hear criticism of inadequate lake linkage and port facilities and traffic has not met expectations. Many believe it will become a monster, consuming funds for patchwork remedies. Others see it as a new kind of aid program, helping foreign companies more than domestic ones. The table below shows why.

(Total cargo in net tons)

	UPBOUND		DOWNBOUND	
	1959	1958	1959	1958
May	785,200	457,593	1,458,250	1,044,497
June	1,245,400	698,401	1,542,500	946,073
July	1,328,900	744,739	1,164,500	902,558
Total*	3,641,500	2,058,157	4,390,000	3,328,289

Source: St. Lawrence Seaway Development Corp.
*Total includes April, which was not a full operating month.

absorbing the new influx of imports.

The final tally of steel and steel products to come down the St. Lawrence won't be available from the St. Lawrence Seaway Development Commission, Massena, N. Y., until February or March. But a rough estimate suggests the total may be triple the 1958 figure. The steel strike may have an abnormal influence here. Much iron ore and pig iron has come from Canada.

On the other side of the ledger, exports of general cargo are expected to top 6 million tons by 1960.

• **The Ports** — Seaway authorities believe Chicago is unquestionably the chief port. Coming to the fore are: Milwaukee and Duluth, followed by Toledo and Cleveland.

The Chicago Port Authority reports revenue for the year ended June 30 was double that of 1958. Chicago could easily use more port facilities, especially for such products as structurals, plates, and bars. A new steel terminal opened last month, and more improvements are in the works. Steel imports in June and July totaled 73,000 tons compared with slightly over 22,000 tons in all of 1957. The majority are from Belgium, with West Germany a poor second.

Milwaukee's lake traffic, triple that of 1958, has been handled adequately. Nevertheless, $11 million is being spent for two new piers, land for harbor development, additional cranes and other facilities, as well as highway access. The port's overseas cargo consists primarily of machinery and foodstuffs. Of the 98,000 tons of commerce handled in the first four months of this year, 13,000 tons were iron and steel products.

Cleveland has spent $5 million in the last five years to enlarge dock facilities and build additional rail access. Steel imports have averaged well over 1000 tons weekly.

Toledo, Ohio, appears to be one of the most aggressive promoters of the seaway on the lakes. Its traffic is running 75 per cent ahead of last year's. Bulk liquids, grain, and coal are the major items. The Port Authority has purchased 65 acres of waterfront sites, of which 28 acres have been fitted with installations. Road machinery, auto parts, and agricultural equipment are the leading export goods. About 12,000 tons of steel had been imported through June 30.

Buffalo is working on additional facilities. About 28,000 tons of steel (compared with 350 tons exported) have been received.

The outlook for Detroit is not good. Squabbling between public and private factions on what and how to expand seems to doom any immediate remedy for Detroit's inadequate dock space. But ship entries are triple what they were last year and 2400 tons of steel are arriving weekly.

Many smaller ports, like Ashtabula, Ohio, with $8 million invested in improved harbor facilities, are scrambling for seaway business.

• **Summary** — Like many things these days, the cost of the seaway is mounting far above the original estimates. And questions arise as to its real value. But when the growing pains are over, most sources feel the seaway will make the rich Midwest richer.

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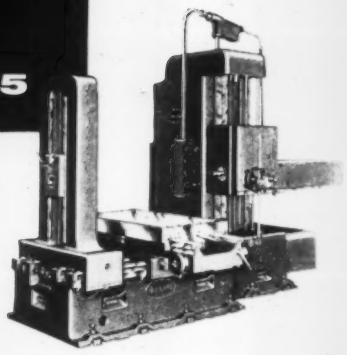

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Chrysler Says It's Set for '60s

THE CRUCIAL question for Chrysler Corp.: Whether its broad reorganization in product design, manufacturing, and market planning has reduced costs so it can show a profit with several cars that still look a lot like its 1957s, plus two exceptions to the finned look, the Valiant and Dodge Dart.

In the first year of the Forward Look, Chrysler sold 1.3 million cars, took 19.5 per cent of the market, and netted $119.5 million. Last year, sales slumped to 696,819 units; net losses were $33.8 million; and market penetration dropped to 14.9 per cent. This year, Chrysler should sell close to 940,000 cars and 70,000 trucks, or something like 15.5 per cent of the market.

F. W. Misch, financial vice president, has revealed that in the third quarter Chrysler hopes to pay off $245 million of the $350 million it has spent to bring the 1960 line to market. It means that the July-September report of earnings will be on the red side. Fourth quarter earnings are expected to cancel out third quarter losses, and the company should wind up the year with net earnings of around $60 million. Chrysler's contract with Lone Star Steel Corp. will give it enough inventory to build cars right through Christmas if the steel strike should be prolonged.

L. L. Colbert reveals company has spent $350 million to bring its 1960 lines to market

Unitized bodies, major change in the Forward Look cars, are dipcoated to prevent corrosion

• **Up Front**—L. L. Colbert, president, predicts that registrations will reach 66 million to 69 million cars by 1965 compared with today's 58 million. He thinks car sales could hit 6.5 million, excluding imports, next year. One company executive tells STEEL what Chrysler must do to turn a profit that will satisfy stockholders and start paying off long term debts: It will have to sell at least 970,000 cars without raising production and marketing costs more than 3 per cent. That's only 15 per cent of the predicted market, but here's why the company thinks it no longer needs 20 per cent of industry sales to break even.

• **Reorganization**—Starting six years ago, Chrysler began a major corporate staff reorganization to get flexibility. Explains Mr. Colbert: "The first thing we accomplished was to realign our operations to bring related activities together in a relatively few major groupings. This has simplified administrative con-

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trol and made easier all the complex tasks like product and market planning, production scheduling, budgeting, and cost control."

The new structure enables Chrysler to delegate authority and responsibility for managing its semi-autonomous operations. At the same time it also has the benefits of centralized purchasing and planning.

• **Manufacturing**—A major reorganization job was completed this year when Chrysler finished consolidating its manufacturing facilities under the direction of R. S. Bright, manufacturing group vice president. Product design, purchasing, and manufacturing are under his central staff control.

Mr. Bright's outfit has staff and line responsibilities. Staff functions include manufacturing engineering, supply of parts, quality control, interplant transportation, and plant protection. Three line groups handle manufacturing. The car and truck assembly group consists of eight assembly plants spotted around the country. With the exception of Imperial, each plant can build any of the corporation's cars with only minor changes in assembly facilities.

The power train group has four axle and transmission plants, one plant for electrical equipment, and two engine plants to build all of Chrysler's car engines. It also has seven forge and foundry plants. The final group, stamping and chassis parts, includes 16 plants. Says Mr. Bright: "Each division can now concentrate exclusively on sales and service. Our job is to deliver the cars they want on schedule and of good quality."

• **Quality**—To recover its reputation for quality, Chrysler has set up a special pilot line plant that turns out 20 cars daily. It's used to train plant managers and inspectors so they can instruct their plant personnel on how to meet quality standards.

Another indirect aid to improved quality and lower costs is the revised work standards Chrysler won from the UAW in 1958 contract negotiations. It's now much more competitive with General Motors and Ford in terms of manhours spent to build each car.

• **Distribution**—The company recently took another step in realigning its dealer network to meet what Mr. Colbert believes will be an increasing demand for economy cars. The corporation has three separate distribution groups. One is for Plymouth, De Soto, and Valiant. Another covers Dodge, Dart, and Dodge trucks. The third is for Chrysler and Imperial.

Previously, 85 per cent of Chrysler's 8000 dealers handled Plymouth, either alone or with another line of cars. Now the company has cut all but 55 per cent of its dealers out of Plymouth distribution. Ultimate goal is about 4000 Plymouth outlets in carefully selected areas. Detroit thinks that Chrysler, with its freshly styled Dart and Valiant, intends to soft-peddle Plymouth because the cars are too high priced for this field. In time, it may slide the Plymouth name onto Valiant if that car does well.

• **Hot Stuff** — There seems little doubt among motordom's reporters that the Valiant and Dart will be industry winners in 1960. Dart is styled without fins and offers a jet tube effect on the quarter panels. Built on Plymouth's 118 in. wheelbase, it is 54.8 in. high and 208 in. long. Although prices haven't been announced, company talk indicates the Seneca series with automatic shift will deliver for around $2560.

The Valiant is Chrysler's big noise. Previewers demonstrated more enthusiasm for it than they have for any car shown so far this year. STEEL's opinion is that, stylewise, Valiant has it all over the Corvair and Falcon in the economy car race. The station wagon, due in late December, is particularly clean lined. Delivered prices will probably be $2300 to $2400. The car is built on a 106 in. wheelbase, 2 to 3 in. shorter than its immediate competitors.

With 6.5 in. road clearance, Valiants are 53.4 in. high and 184 in. long. They're some 340 lb heavier than the Chevrolet and Ford cars which average 2350 lb in curb weight, but the more powerful engine (104 hp) compensates for the extra weight (STEEL, Sept. 14, p. 128). Jack E. Charipar, chief engineer, Plymouth-De Soto-Valiant Div., says the engine's torque curve is similar to that of V-8s.

Mr. Colbert says Chrysler will start building Valiants at the company's Hamtramck, Mich., plant and will phase in production in its $50 million St. Louis plant in January. Production capacity is 300,000 cars. The Valiant will be introduced at the end of October.

• **Questionable**—Although the Valiant and Dart offer some of the more refreshing styling in the industry this year, Chrysler's other lines are still following the Forward Look introduced in 1957.

• **Design Changes**—Underneath the sheet metal, Chrysler has done a job with its unitized construction and the slant, overhead valve, six engine. The unit bodies are used on all cars but Imperials.

• **Other Assets** — With Chrysler's foreign distribution network shaped up (STEEL, May 4, p. 55), it is in the best shape of any auto company to start exporting (Valiants). Corridor talk is that it will make the move after it meets domestic demand. Simca sales are two and a half times higher than they were a year ago. The company has imported and sold 30,000 Simca's in the first half. Dodge's entry into the diesel truck field and the addition of another series of medium and heavy duty trucks will improve the company's competitive standing.

U. S. Auto Output

Passenger Only

	1959	1958
January	545,757	489,515
February	478,484	392,132
March	576,085	357,048
April	578,825	316,594
May	546,817	349,613
June	557,994	337,446
July	555,418	321,017
August	238,773	180,447
8 Mo. Totals	4,078,153	2,743,812
September		130,460
October		261,701
November		514,152
December		593,920
Total		4,244,045
Week Ended	1959	1958
Aug. 22	31,848	25,918
Aug. 29	18,335	16,771
Sept. 5	17,261	12,314
Sept. 12	24,364	24,072
Sept. 19	61,734†	37,150
Sept. 26	100,000*	42,599

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Cost-reduction program extended:

Lyon Metal Products, Inc., duplicates Wean coil processing lines at second plant

Lyon was one of the first metal fabricators to install its own coil processing equipment. At its Aurora, Ill. plant, Wean slitting and shearing lines were installed in 1953 to supply various sizes of resquared sheet directly from standard coil.

The 6 years' experience with this Wean coil processing equipment has thoroughly proved its economic value to Lyon. Inventory requirements have been reduced and major savings realized in purchased material and labor costs. Mr. J. B. O'Connor, an official of Lyon Metal Products says, "This Wean installation has performed so satisfactorily that we unhesitatingly duplicated it at our York, Pa., plant."

The new Wean equipment at York uses the versatile Wean "Flying Press" to cut lengths of 11" to 96" from slit coil varying in width from 3¼" to 47½". Strip is fed at up to 300 fpm with 1/64" accuracy maintained on all cuts. Lengths are changed many times per shift, the simple adjustments being made by dial settings on the "Flying Press."

If your plant uses large quantities of sheet, you can cut costs by the use of Wean coil processing techniques. An experienced Wean sales representative will be glad to work with you on evaluating just how much you can save: most users have found the pay-off period to be less than two years. We'll be glad to send you more information.

WEAN EQUIPMENT CORPORATION
CLEVELAND 17, OHIO
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WEAN

Meet the "MECHANICAL CHEF"...

and its helper, Stainless Steel!

Ravioli is destined for even greater popularity . . . thanks to this unique "mechanical chef".

With it, volume production is possible—quality can be easily maintained. The operator simply fills the hoppers—the "chef" automatically rolls the dough, inserts the stuffing, shapes and cuts the ravioli...at *18,000* pieces per hour. Dough thickness and stuffing quantity can be precisely controlled for uniform taste and peak flavor.

Stainless steel is specified for all working parts . . . to assure purity, meet sanitary codes. Stainless provides corrosion resistance, easy cleaning—and economy, through trouble-free operation and extended life. The ravioli "chef" is made of stainless steel rounds, squares, flats, sheets—even *welded* and *seamless* tubing. And every bit of stainless is obtained *overnight*—from Frasse.

It pays, when you're working with stainless, to work from Frasse stocks. Frasse carries every rolled form—in a wide range of sizes and analyses... delivery is immediate. You'll like the freedom of choice Frasse stainless stocks provide...find satisfaction in having a reliable source for *everything* in stainless. Call us.

Call FRASSE 1st for

COMPLETE STAINLESS STEEL SERVICE

Bars	Tubing
Forgings	Pipe
Sheets	Wire
Strip	Fittings
Plates	Valves

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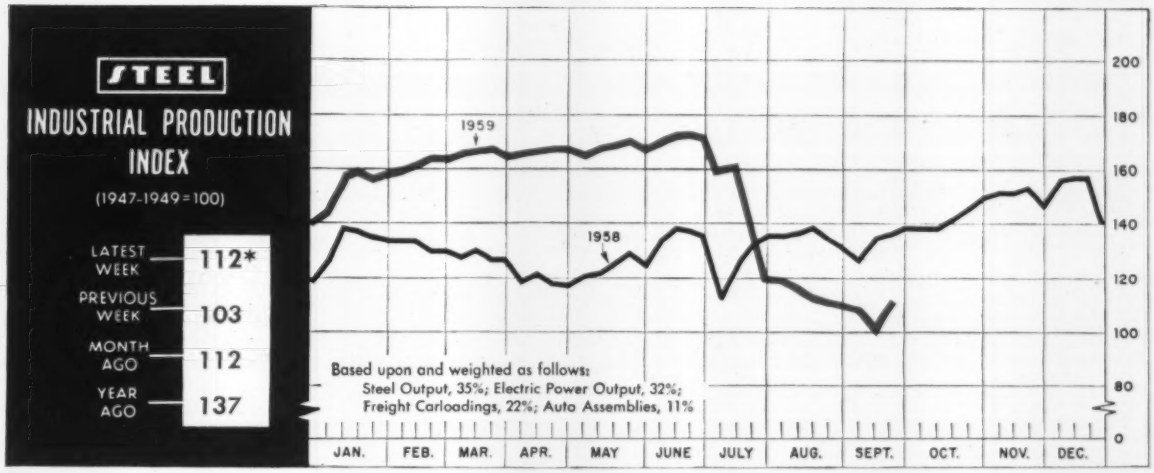


*Week ended Sept. 19.

Trend Starts Up, but Not for Long

FOR THE FIRST TIME in ten weeks, STEEL's industrial production index trend line has turned up, but don't let it lull you into a false sense of security. The worst may still be ahead.

Two reasons for the cloud on the economic horizon: 1. There is still no sign of an end to the steel strike. 2. There are signs that the strength behind the rapid rise from last year's recession is dissipating.

• **Cause for Rise**—The 9 point gain in STEEL's index (from 103 to a preliminary 112 per cent of the 1947-49 base period) in the week ended Sept. 19 is an ordinary occurrence following the Labor Day week. At this stage of the game, it cannot be regarded as a fresh show of strength. Nor can the anticipated small increases in the next few weeks be taken as a sign of a new upturn for the economy as a whole. Reason: It will be accounted for almost wholly by the automotive industry.

As long as steel supplies last, carmakers will push every new model they can into dealers' showrooms to remain competitive. But storm warnings are flying over Motordom because steel supplies are dwindling. General Motors Corp. is reported to be counting the days left before it will have to cut back, if not close down. Ford Motor Co. and Chrysler Corp. are probably in a little better shape, but even they will feel the pinch if the steel strike goes too far into October.

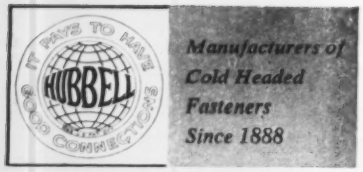
• **Creeping Stagnation**—As for the rest of the economy, the Federal Reserve Board's August report of industrial production showed that the strike slowed things down some, and the trend undoubtedly became more intense this month. The FRB's index dropped another 4 points, even after seasonal adjustment, to a preliminary 149 (1947-49=100).

In July, all the decline was accounted for by primary metals, but the latest drop was attributed to

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1,000 net tons)[2]	354[1]	356	1,816
Electric Power Distributed (million kw-hr)	13,300[1]	13,109	12 240
Bituminous Coal Output (1,000 tons)	6,385[1]	7,315	8,457
Crude Oil Production (daily avg—1,000 bbl)	6,800[1]	6,813	7,087
Construction Volume (*ENR*—millions)	$298.5	$338.8	$332.4
Auto, Truck Output, U. S., Canada (*Ward's*)	85,342[1]	37,287	54,547
TRADE			
Freight Carloadings (1,000 Cars)	550[1]	481	667
Business Failures (Dun & Bradstreet)	222	308	256
Currency in Circulation (millions)[3]	$32,197	$32,107	$31,393
Dept. Store Sales (changes from year ago)[3]	−9%	+20%	+4%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$26,209	$18,314	$23,795
Federal Gross Debt (billions)	$290.0	$290.2	$276.8
Bond Volume, NYSE (millions)	$31.8	$27.3	$32.3
Stocks Sales, NYSE (thousands of shares)	12,222	11,138	18,111
Loans and Investments (billions)[4]	$105.0	$104.9	$94.7
U. S. Govt. Obligations Held (billions)[4]	$28.9	$29.1	$32.7
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	246.65
STEEL's Nonferrous Metal Price Index[6]	225.3	222.6	197.9
All Commodities[7]	119.6	119.4	119.0
Commodities Other than Farm & Foods[7]	128.3	128.3	126.0

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1959, 2,831,486; 1958, 2,699,173. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.



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OVER **5** TIMES THE RATE AT **45%** LESS COST

Another example of how Hubbell Cold Heading produces Better Parts at Faster Speeds, at Lower Cost

THE PART:
Special 1-64 Miniature Binding Screw

THE MATERIAL:
18-8 High Tensile Stainless Steel

THE METHOD:
Hubbell Cold Heading in place of screw machining

THE RESULT:

a. Production increased from original rate of 7000 pc. p.d. to cold heading rate of 40,000 pc. p.d.

b. Cost reduced 45%

c. Finer Quality—More Economical Production

1. Higher Tensile Strength
2. Cleaner, Stronger Threads
3. No Scrap Waste
4. No Separation from Chips

Hubbell Cold Heading may provide equally dramatic results for you. Whether it is presently cold headed or not, send blueprint of part or sample for analysis and estimate.

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Kindly estimate on the enclosed
Sample (Blueprint). Quantity .....

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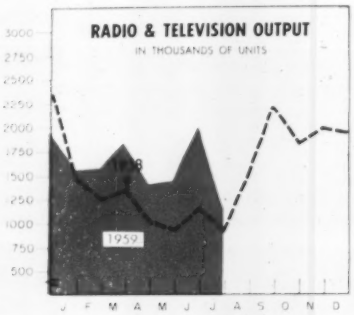
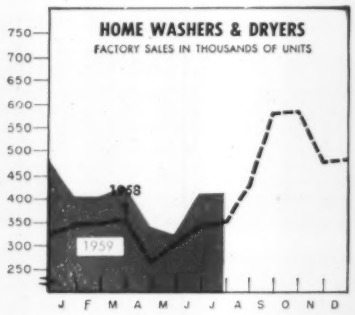
THE BUSINESS TREND





	Radio		Television	
	1959	1958	1959	1958
Jan.	1,125	1,026	437	434
Feb.	1,125	877	459	370
Mar.	1,348	931	494	417
Apr.	1,040	630	389	303
May	1,040	655	432	267
June	1,430	774	571	337
July	829	593	350	275
Aug.	.....	1,029	...	507
Sept.	.....	1,572	...	622
Oct.	.....	1,322	...	496
Nov.	.....	1,546	...	438
Dec.	.....	1,526	...	415
Totals	.....	12,481	...	4,921

Electronic Industries Association.

	Washers		Dryers	
	1959	1958	1959	1958
Jan.	288,491	244,840	118,220	100,793
Feb.	297,826	268,143	106,274	79,683
Mar.	329,668	287,884	98,434	71,523
Apr.	274,372	224,896	67,752	38,475
May	277,934	262,999	45,903	41,898
June	341,894	288,831	70,838	54,173
July	318,063	277,287	95,248	75,513
Aug.	.....	326,785	.....	109,833
Sept.	.....	423,073	.....	158,733
Oct.	.....	404,056	.....	180,405
Nov.	.....	333,035	.....	142,499
Dec.	.....	330,520	.....	148,670
Totals	.....	3,672,349	.....	1,202,198

American Home Laundry Mfrs. Assn.

Charts copyright, 1959, STEEL.

practically all segments of the durable goods classification. Only nonelectrical machinery, instruments, and the furniture and miscellaneous categories managed to hold their ground. Nondurable goods industries held at their July record high of 146.

• **Less to Spend**—A further indication of the impact of the strike is the drop in personal income during August following seven continuous months of uptrend. Last month, the seasonally adjusted annual rate dipped to $381.4 billion, down $2.6 billion from July's record rate. Hardest hit were the primary metal, transportation, and mining industries. Fabricated metals and machinery contributed a small portion of the loss.

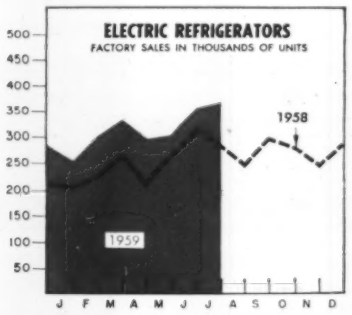
Next to steel, probably the hardest hit industry is transportation. The Association of American Railroads puts the weekly loss at 140,000 to 160,000 cars of revenue freight. It says the loss since July 15 is about 1,340,000 cars. It's estimated that between 125,000 and 150,000 railroad workers are either out of work or putting in significantly shorter hours. Railroad profits are down, causing cutbacks in capital spending plans. Last month, Class I roads ordered only 1753 new freight cars, the lowest monthly total since October, 1958. But the roads took delivery on 4890 new cars in August compared with 4273 in July and 2151 in August, 1958, says the American Railway Car Institute.

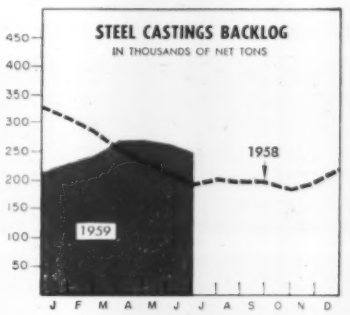
While most of these developments can be blamed on the steel strike, some people see a lull in the general economy. The Federal Reserve Bank of Minneapolis thinks the recovery has begun to slow down in that district, and it "cannot be traced to the steel strike." Business in the latest month, as measured by the seasonally adjusted index of the bank's debits, was down from the previous month's level.

Further, but not conclusive, evidence of a slowdown is the fact that all but one (business incorporations, Page 101) of the eight leading business indicators are in a downtrend and have been from one to three months. In some cases, the steel strike may be influencing those trends, but the situation will not become clear until after a settlement.

Strike Pressures Building Up

Fred O. Kiel, senior economist of the Federal Reserve Bank of Cleve-





	1959	1958	1957
Jan.	256,200	206,100	305,400
Feb.	306,200	227,800	298,700
Mar.	333,700	261,100	309,300
Apr.	301,000	210,800	281,600
May	308,200	262,900	303,700
June	361,000	316,300	305,100
July	370,800	279,700	318,000
Aug.	.....	245,900	240,500
Sept.	.....	295,800	265,200
Oct.	.....	277,900	261,500
Nov.	.....	245,500	246,400
Dec.	.....	286,900	214,600
Totals	.....	3,116,700	3,350,000

National Electrical Mfrs. Assn.

	Shipments		Unfilled Orders*	
	1959	1958	1959	1958
Jan.	105.4	120.7	232.6	304.9
Feb.	110.3	103.3	245.1	282.4
Mar.	131.3	106.2	270.7	252.8
Apr.	134.3	91.5	271.6	229.5
May	135.4	87.0	264.0	211.3
June	143.6	92.9	248.8	190.8
July	....	68.8	....	200.3
Aug.	....	80.9	....	196.3
Sept.	....	85.3	....	196.5
Oct.	....	95.4	....	184.9
Nov.	....	85.3	....	194.0
Dec.	....	103.8	....	214.4
Total	....	1,121.1		

*For sale. U. S. Bureau of the Census.

land, believes that three pressures will build up to bring a settlement in the strike. First is the slowdown in metalworking that is already underway. Second is the possible shortage of iron ore. He feels the strike must be settled by Oct. 15 if steelmakers are to have even a bare chance of getting through the winter with enough ore. (See Page 79 for more on iron ore supplies.) Third, pressure from the disputants themselves will rise as their losses—profits, markets, and wages—rise. (See Page 78 for scoreboard.) Fourth is the threat of a Taft-Hartley injunction, which he says is distasteful in both parties. (See Page 77.)

Appliance Records Loom

Appliance makers will do an $8.5 billion business this year, indicates an industry survey by Prentice-Hall Inc., Englewood, N. J. The gain: 15 per cent above the 1958 figure and equal to the record set in 1956. Even if the steel strike slows down their fourth quarter, the 30 per cent bulge they marked up in the first half over last year should give them enough cushion to reach the goal. (See graphs and tables, Pages 100-101.)

Among the leaders are: Radios, with a 52 per cent year-to-year gain through the first seven months and headed for the biggest unit volume since 1948; room air conditioners, which should total about 1.8 million unit sales this year; built-in ranges, already ahead of the year-ago tab by 51 per cent and headed for a record despite a slowdown in home building during the last half of 1959; home laundry equipment, up 18 per cent over the corresponding period of 1958 through July, and led by combinations, which will set a record 225,000 units this year.

Charters, Failures Climb

While the business community boasted of more new charters in August, it also lost more of its older members. Dun & Bradstreet Inc., reports that incorporations last month set a record for August with 14,329 charters. It was the fourteenth consecutive time a monthly record has been set. But failures also increased, reaching 1135 companies, 6 per cent more than in July. However, the total was below the postwar peak for an August, set in 1957. Liabilities also rose, hitting $54.5 million, exceeding the year ago figure for the first time last January.

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Hayes Sales Engineer
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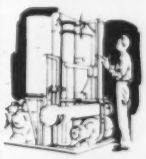

HAYES SHOWED THE WAY— others followed. There are several "Chinese copies" of the Hayes lab in industry today . . . proof positive that the right way to solve heat treat problems is the Hayes way — by experimentation and demonstration — not by "sweet talk".

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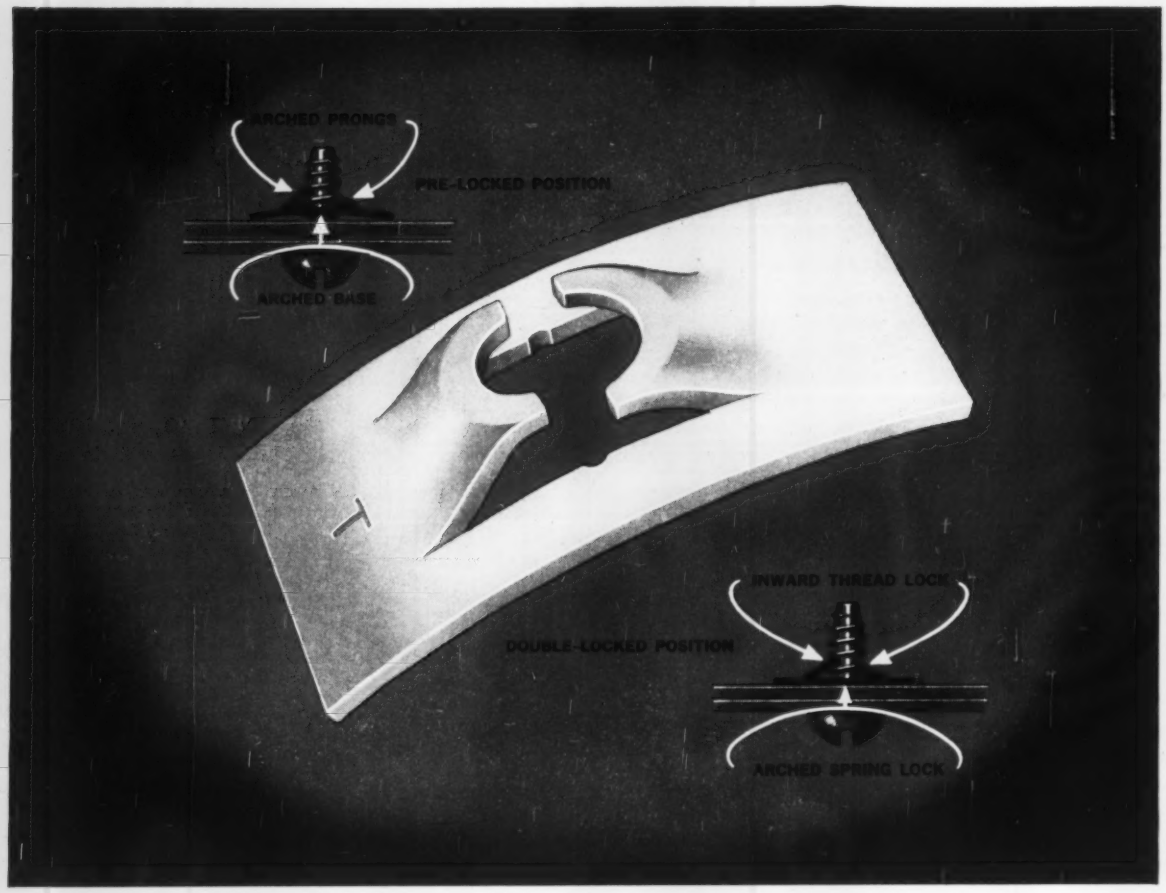

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Self-locking **SPEED NUT**® goes on fast, never shakes loose...and reduces costs!

With only one piece to handle, you can quickly position this Tinnerman Flat-Type SPEED NUT in screw-receiving position in one motion. No threaded nuts, no lock washers, no spanner washers to worry about.

Drive the screw and this spring-steel fastener locks tight, never to shake loose; yet easy to remove and reuse whenever you desire. SPEED NUTS won't freeze on screw threads!

Tinnerman Flat-Type SPEED NUTS are made in a full range of sizes, tensile strengths and corrosion-resistant finishes. Design variations also provide many multiple-function special types.

Lower cost per thousand plus lower cost of assembly give you maximum cost-reduction benefits... with maximum fastening assurance.

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JOHN N. DAVENPORT
Fulton Foundry president

PHILIP C. DeBRUYNE
Moline Malleable president

WALDO W. SMITH
Tower Iron Wks. v. p.

STEPHEN PAREY
U. S. Steel purchasing

John N. Davenport was elected president of **Fulton Foundry & Machine Co.**, Cleveland. He succeeds **Frank L. Barton**, retired. Mr. Davenport was vice president-general manager. **Edward Burkholder** was elected vice president-sales and sales manager.

Philip C. DeBruyne was elected president, **Moline Malleable Iron Co.**, St. Charles, Ill. He was vice president. **Gorton Fauntleroy**, former president, becomes chairman.

John F. Hines was made sales manager, Cutting Tool Div., **Brown & Sharpe Mfg. Co.**, Providence, R. I. Associated with the company since 1937, mostly in a sales capacity, he most recently had offices in Plymouth, England, where his duties as foreign sales manager covered supervision of the sale of B&S machine tools outside the U. S. and Canada.

Frank W. Grosick fills the new post of sales manager-steel mill cranes for **Harnischfeger Corp.**, Milwaukee.

Alex McClure was made general sales manager, **Pacific Coast Engineering Co.**, Alameda, Calif. He was sales manager, American Glass Fibers Inc.

John N. Lewis was named Detroit district sales manager, **Patterson Foundry & Machine Co.**, to replace **A. T. Jacobson**, recently named general sales manager of the company. Prior to joining Patterson, a division of Ferro Corp., Mr. Lewis was with Boydell Bros. Co.

Waldo W. Smith was promoted to vice president of **Tower Iron Works Inc.**, Providence, R. I. He was general manager.

Dr. I. Richard Gregor was appointed director of manufacturing-foreign operations by **J. I. Case Co.**, Racine, Wis.

Charles B. Hausen fills the new post of corrosion engineer for **Bunker Hill Co.**, Kellogg, Idaho.

Tom C. Smithson was promoted to superintendent, Coke Plant Dept., Middleton, Ohio, plant, **Armco Steel Corp.** He succeeds the late **Joseph McLaughlin.**

Gerald Lewis succeeds **William C. Hookway Jr.**, resigned, as director of product engineering, **Cooper Alloy Corp.**, Hillside, N. J. Mr. Lewis joined Cooper Alloy in 1953 as sales manager, Vanton Pump & Equipment Div.

L. M. Faulkner was named sales manager-data processing for the Controls Div., **Hagan Chemicals & Controls Inc.**, Pittsburgh. He succeeds **Hammond Ladd**, resigned.

Nalco Chemical Co., Chicago, named **Dr. David G. Braithwaite** to the new post of executive vice president in charge of manufacturing, research and development.

Benjamin L. Binford was named research co-ordinator of **Republic Flow Meters Co.**, Chicago, subsidiary of Rockwell Mfg. Co. He was vice president and chief engineer of Magnetrol Inc.

Stephen Parey was made purchasing agent, office equipment and supplies, **United States Steel Corp.**, Pittsburgh. He succeeds **Robert Muirhead**, retired.

Daniel J. Spillane was made sales manager, **Kensico Tube Co. Inc.**, Mt. Kisco, N. Y. He retired last June after 38 years with Revere Copper & Brass Inc.

Chicago Rawhide Mfg. Co., Chicago, appointed **Joseph R. Crosby** administrative vice president in charge of manufacturing. He was assistant to the president.

George Hamburger was promoted to sales manager of **Copperweld Steel Co.**'s Wire & Cable Div., Glassport, Pa.

Robert R. Hopper, division manager of marketing, Products Div., **Kaiser Aluminum & Chemical Corp.**, Oakland, Calif., assumes added duties as head of a new department of product planning and development established within the Products Div.

Conrad G. Meyer Jr. was made assistant sales manager, **Lakeside Malleable Castings Co.**, Racine, Wis.

Lockwood Oliver Jr. was made sales manager of **Bardons & Oliver Inc.**, Cleveland. He succeeds **Edwin F. Huge**, retired vice president-sales.

Jack H. Powers was named supervisor of metallography at **Adamas Carbide Corp.**, Kenilworth, N. J.

Mabbott B. Steele was made New York district sales manager, Steel &

DAN C. SWANDER JR.
Columbian Vise president

B. W. BOGAN
Chrysler v. p.

J. H. WERNER
Lee Wilson sales mgr.

MICHAEL ZETZ
J&L plant manager

Tubes Div., **Republic Steel Corp.** He succeeds the late **I. H. Anderson.**

Dan C. Swander Jr., former executive vice president, **Columbian Vise & Mfg. Co.**, Cleveland, succeeds **H. F. Seymour** as president. Mr. Seymour was elected chairman.

B. W. Bogan was elected a vice president of **Chrysler Corp.**, Detroit. Former executive assistant to Executive Vice President W. C. Newberg, he assumes responsibilities for purchasing and supplier relations, in addition to present activities on organization and general operations for the executive vice president. **Emlyn Lloyd** continues as director of purchasing administration, reporting to Mr. Bogan.

Stanley R. Curtis was made project engineer for **Tranter Mfg. Inc.**, Lansing, Mich.

James A. Marohn, vice president, Crane Co., Chicago, joins **Leece-Neville Co.**, Cleveland, Oct. 1 as executive vice president.

J. H. Werner was named sales manager, **Lee Wilson Engineering Co. Inc.**, Cleveland. Former assistant sales manager, he assumes duties handled by **J. L. Whitten**, vice president, who will devote more time to company policy.

John G. McLain was made western sales manager, foundry and mill machinery, **Blaw-Knox Co.** He has headquarters at Millbrae, Calif.

L. M. Limbach was made corporate director of manufacturing, **Aerojet-General Corp.**, Azusa, Calif. Since 1956 he has been vice president-general manager of Rheem Mfg. Co.'s Defense & Technical Products Div., which Aerojet-General purchased in June.

Charles Rinderle Jr. was elected vice president, **Southwest Steel Rolling Mills**, Los Angeles.

Bernard J. Alperin was made manager-product engineering for the Everett, Mass., Foundries, **General Electric Co.**

Michael Zetz was appointed plant manager for the Louisville, Ohio, plant of **Jones & Laughlin Steel Corp.'s** Stainless & Strip Div. He joined J&L in 1958 as superintendent of quality and production control at the Louisville plant. He was formerly with Crucible Steel Corp.

Edgar K. Lofton was made manager-railway sales, **SKF Industries Inc.**, Philadelphia.

William B. Bosworth was made assistant vice president, **Korhumel Steel & Aluminum Co.**, Evanston, Ill.

J. F. Allen was promoted to manager of manufacturing, Pressure Control Equipment Div., **Cameron Iron Works Inc.**, Houston. **Harry H. Walsh** succeeds Mr. Allen as manager of the guided missile plant. Mr. Walsh was manufacturing engineer of the plant.

Charles J. Naulty was made sales manager for the Pacific Southern

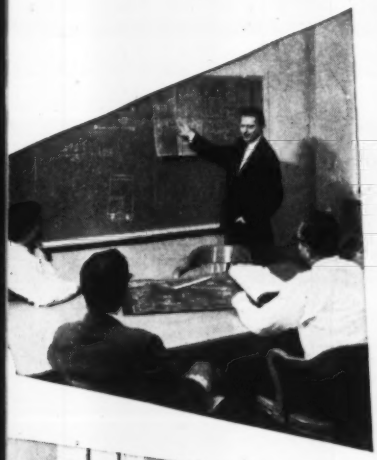
JAMES A. MAROHN
joins Leece-Neville

CHARLES RINDERLE JR.
Southwest Steel v. p.

BERNARD J. ALPERIN
GE-Everett Foundries post

J. F. ALLEN
Cameron Iron Wks. post

LOOK INTO THIS



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Fifteen engineering groups in the McKee organization are staffed by specialists in all the various phases of design, engineering, purchasing and construction. Every type of plant, individual unit and related facility for the steel, petroleum, chemical and non-ferrous metals industries are included in McKee's fifty-four years of world-wide experience.

If it is your responsibility to select an engineering-construction firm, it will pay you well to look into the McKee "stockroom." We'll welcome an opportunity to show you how efficiently the McKee organization can work for you.

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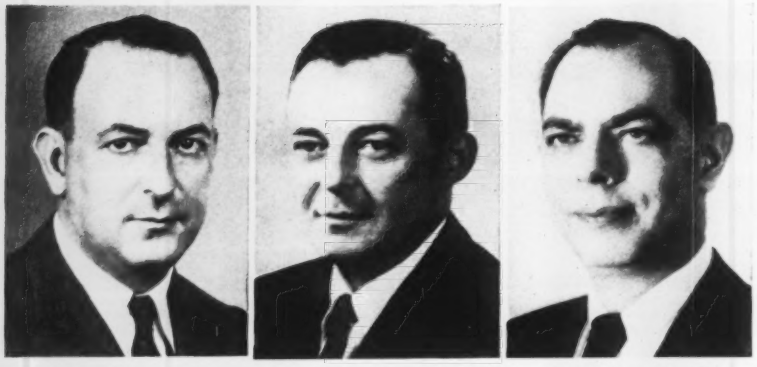
McKEE ENGINEERING AND CONSTRUCTION SERVICES



GEOFFREY PAGET
Shaw Process metallurgist

JAMES W. WILCOCK
Westinghouse-Sturtevant mgr.

CLIFFORD E. HARRIS
Federal Pacific div. mgr.

KENITH STRUNK
Textile Machine Wks. v. p.

RICHARD C. SCOTT
joins Dresser Electric

GEN. JOSEPH M. COLBY
Rockwell v. p.-eng.

Div., **Link-Belt Co.**, at Montebello, Calif.

Kenith Strunk fills the new post of vice president-research and engineering at the Wyomissing plant of **Textile Machine Works**, Reading, Pa. He most recently was director of engineering at Breeze Corporations Inc.

Richard C. Scott was made director of staff engineering by **Dresser Electric Co.**, Detroit. He served for 20 years with Udylite Corp. as chief electrical engineer.

Theodore Q. Dziemianowicz was appointed chief process engineer for Indox materials at **Indiana Steel Products Co.'s** Plant No. 2, Valparaiso, Ind.

Edward C. Lanno was made director of manufacturing services, **Saco-Lowell Shops**, Boston.

Harvey Gaylord was elected president and chief executive officer, **Bell Aircraft Corp.**, Buffalo. He continues as president of the subsidiary, Bell Helicopter Corp.

Gen. Joseph M. Colby, deputy commanding general, U. S. Army Ordnance Missile Command at Redstone Arsenal, Ala., was named vice president of engineering for **Rockwell Mfg. Co.**, Pittsburgh. The appointment is effective Oct. 1, date of General Colby's retirement. **C. A. Wiken**, vice president-research and engineering, becomes vice president-research and development following separation of research and development activities from product engineering.

Warwick J. Hayes Jr. was elected executive vice president and general manager, **Industrial Brownhoist Corp.**, Bay City, Mich., subsidiary of American Steel & Pump Co.

George P. Peuhl was named manager of custom products manufacturing, **Toledo Scale Corp.**, Toledo, Ohio.

Bruno Gruenwald was made special project engineer for mechanical dust collectors, **Research-Cottrell Inc.**, Bound Brook, N. J.

Geoffrey Paget was made chief metallurgist for **Shaw Process Development Corp.**, Port Washington, N. Y., subsidiary of British Industries Corp.

James W. Wilcock was appointed manager of the **Sturtevant Div.** of Westinghouse Electric Corp., Hyde Park, Mass. He was marketing manager of the division.

Economy Fuse Div., Chicago, Federal Pacific Electric Co., appointed **Clifford E. Harris** division manager, **John S. Messer** executive consultant, **John W. Muse** division marketing manager. Messrs. Harris and Messer had been vice president and president, respectively, of Economy Fuse & Mfg. Co. when it was acquired by Federal Pacific last January. Mr. Muse was Federal's Boston branch sales manager.

Theodore B. Kling was made manager of corporate offices and warehouses of **Stanley Works**, New Britain, Conn. He was eastern division sales manager, Gibson Div., Hupp Corp.

William J. Hagan III was made director of electrical conductor sales of **Southern Electrical Co.**, Chattanooga, Tenn., an operation of the Metals Div. of Olin Mathieson Chemical Corp. He succeeds **H. H. Bullen**, now a consultant.

Norman P. Levine fills the new post of executive director-purchasing, **Landers, Frary & Clark**, New Britain, Conn. **Arnold W. Bahder** fills the new post of director of merchandising for all company divisions and subsidiaries.

Wayne D. Johnson was made assistant sales manager for **Norma-Hoffmann Bearings Corp.**, Stamford, Conn.

William G. Hodson was made regional manager-Indiana territory for **Mid-West Abrasive Co.**, with offices in Indianapolis.

OBITUARIES...

Horace B. Horton, 73, chairman, **Chicago Bridge & Iron Co.**, Chicago, died Sept. 17.

Chester T. Reed, 78, retired president, **Reed & Prince Mfg. Co.**, Worcester, Mass., died recently.

quality

SPECIFY PENOLA LUBRICANTS...

for greater efficiency in plant operation... more protection for valuable machinery.

- Penola Lubricants are manufactured to the highest standards of quality through the use of the most modern techniques and facilities.
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The Penola name is your guarantee of...

- **QUALITY**
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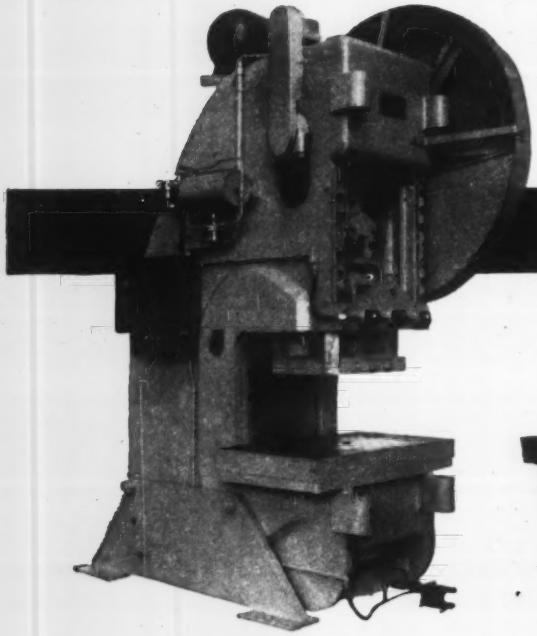
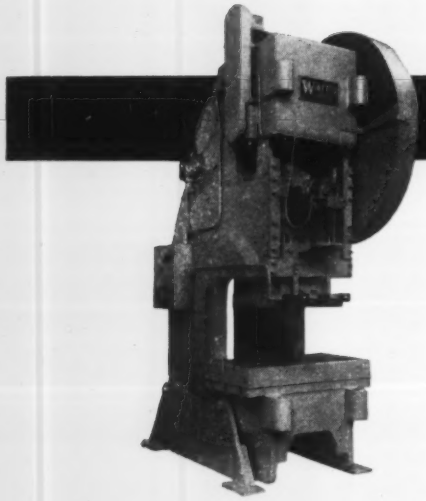
Penola



200-ton standard

Warco®

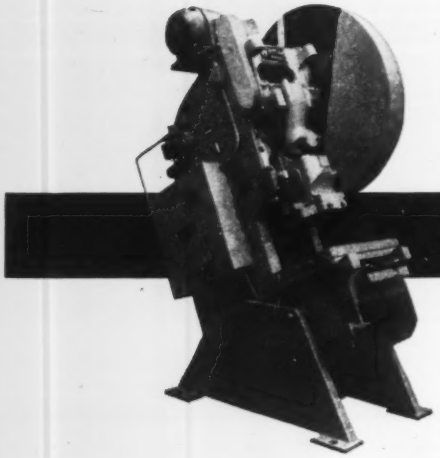


150-ton with power slide adjustment

the OBI line with the built-in extras...

Warco—Quality Press Line—gives you *all* these "extras" in an OBI press: welded steel frame of plate much stiffer than cast iron or Meehanite; pneumatically operated combined friction clutch and spring-loaded brake; saddle type connection; long, hand scraped gib ways; heat treated crankshaft; high grade steel gears with heat treated pinions; and rotary type limit switches for press control.

Before you buy any OBI, compare and you'll buy Warco. They're available in capacities from 40 to 200 ton.



60-ton standard OBI inclined position

The Federal Machine and Welder Company
Warren • Ohio

Federal® WELDERS

Warco PRESSES®

$2 Million Quebec Ore Project Planned

QUEBEC CARTIER MINING CO., a subsidiary of U. S. Steel Corp., has arranged to borrow up to $2 million from a group of Canadian and U. S. banks to help finance a major iron ore project in Quebec.

The development will be in the Lac Jeannine area and includes construction of a new harbor and loading facilities at Port Cartier, a 193 mile railroad from Port Cartier to Lac Jeannine, a 60,000 hp hydroelectric plant on the Hart-Juane River, and the preparation of a large open pit mine and concentrator to produce 8 million tons of high grade iron ore concentrates annually. Production is scheduled to begin late in 1960 or early 1961. The ore is to be marketed in Europe, the U. S., and Canada.

Ties and tracks have been laid on about 80 miles of the railroad. The ore mill is already built.

Mill Licks Air Pollution

Over 97 per cent of the contaminants are removed from open hearth gases released to the atmosphere at U. S. Steel's Homestead Works, Pittsburgh. The method: Electrostatic precipitators made by Western Precipitation Corp., Los Angeles. The system is said to be the largest designed for open hearth fumes. A single main flue is used for gases from all the furnaces to the precipitators.

Talco Gets Ejection Work

Talco Engineering Co., a subsidiary of Gabriel Co., Cleveland, has received a contract (about $1.6 million) for the manufacture of rocket motors, rotational and vertical thrusters, and other components of the "B" seat ejection system for Convair's F-106.

Pure Aluminum Offered

Aluminum with a guaranteed purity of 99.992 per cent is being produced commercially in substantial quantities by Aluminum Foils Inc., Jackson, Tenn. The metal is available in various pig sizes, ingots, billets, pellets, coiled sheet, and foil. It is also available in alloys comparable to common aluminum alloys and with greater structural strength.

Superpurity aluminum is being used in chemical, refining, processing, and electrical industries where its low iron and copper contents are important in the refining and alloying of other metals.

Alcoa Plans Plant, Lab

Aluminum Co. of America will begin constructing a diecasting plant in Edison Township, N. J. The plant, originally scheduled to be built in 1957 but deferred, will start operating late in 1960. Cost: $2 million.

A planning program also is underway for a multimillion dollar research and development center at Merwin, Pa. Ground breaking on the 2400 acre site will take place within a year.

Pullman in Freight Field

Pullman Inc., Chicago, has entered the railroad freight car leasing business with the establishment of a new subsidiary, Transport Leasing Co. The first cars in the fleet: One-hundred, 85 ft piggyback units recently completed by Pullman-Standard Div. of Pullman Inc. President Champ Carry said: "While we are optimistic as to the long range potential of the new leasing activity, it is not likely to weigh heavily in our total operations for some time to come."

Solar Plans R&D Center

Solar Aircraft Co., San Diego, Calif., will erect a 62,000 sq ft engineering and research building on its bayfront plant site. Cost of building and equipment: More than $1 million. Occupancy is expected by May 1, 1960.

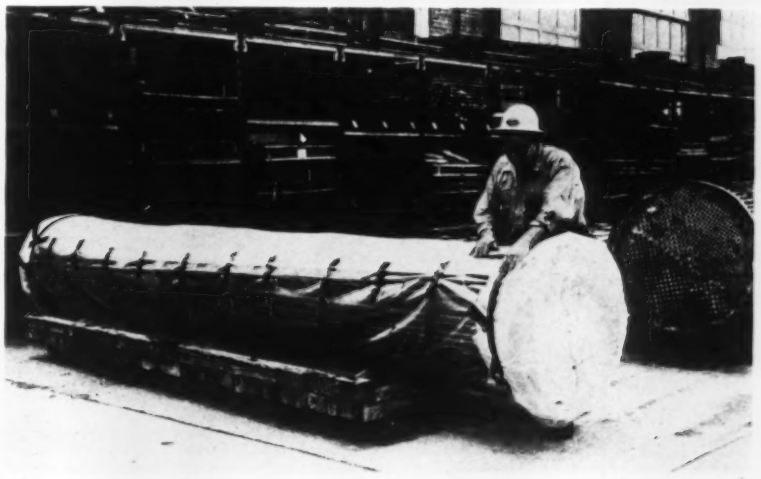
Wanson Opens U. S. Plant

Wanson Corp. has been incorporated in Lewistown, Pa., to manufacture and sell Thermobloc industrial and commercial warm air heaters under license from Establishments Wanson, Brussels, Belgium. The Belgian firm is the world's largest producer of warm air heating equipment.

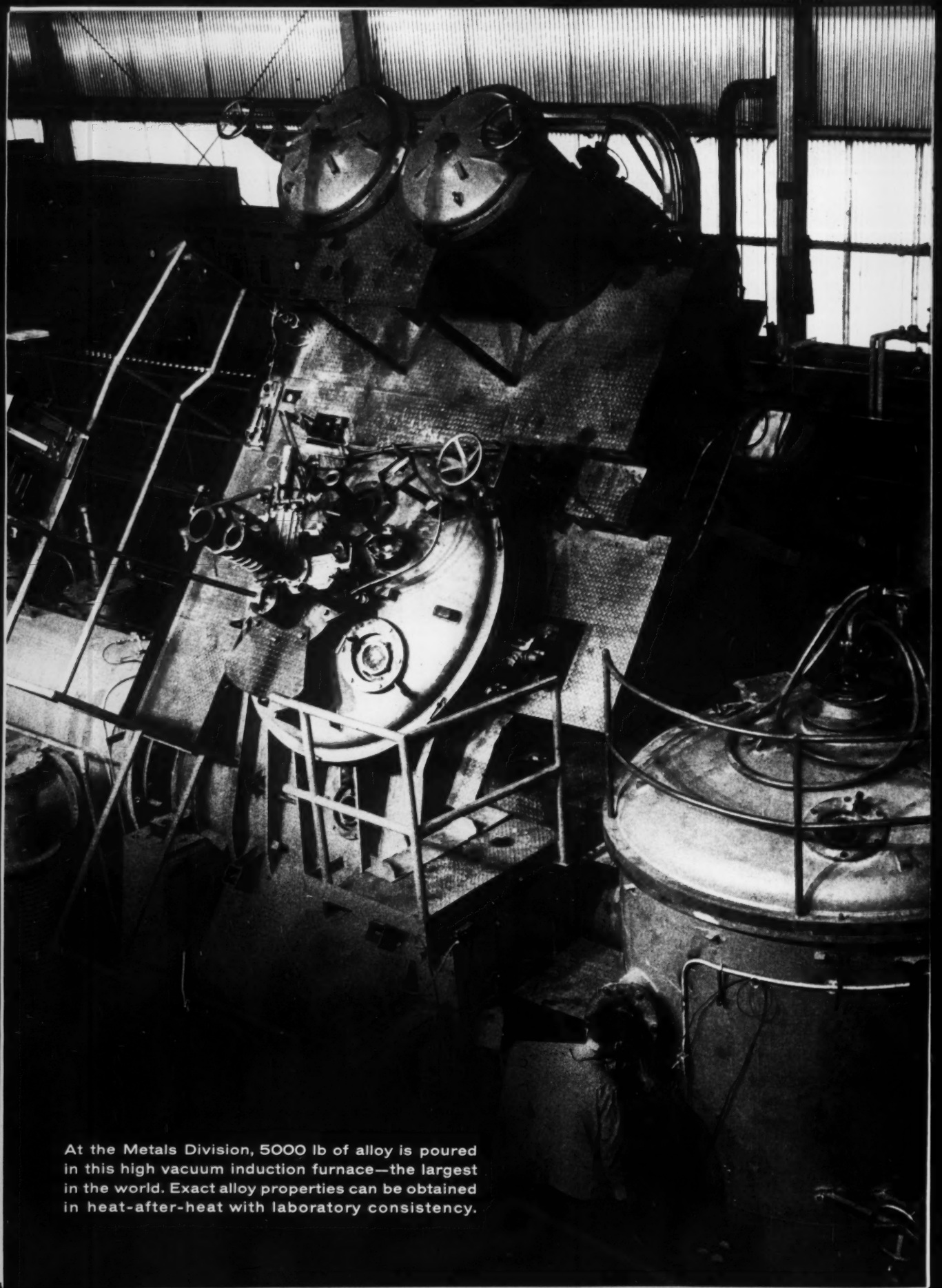
Sea Water Project Begun

Ground has been broken for California's first general purpose sea water distillation plant. The facil-

(*Please turn to Page* 112)



THIS KING SIZE PLASTIC "BAG" will protect carbon steel tubes from corrosion during storage at Esso Standard Oil Co., Linden, N. J. The combination of an antirust coating and a covering of polyethylene plastic film is expected to provide efficient and lasting protection, plus speed and ease of handling, at about one-eighth of the cost of mothballing



At the Metals Division, 5000 lb of alloy is poured in this high vacuum induction furnace—the largest in the world. Exact alloy properties can be obtained in heat-after-heat with laboratory consistency.

Are you after highest alloy properties in heat-after-heat?

100 per cent alloy composition control assured by vacuum induction melting

Highly reactive elements enhance high-temperature alloy properties. Today, only one production metal refining process can effectively control the action of these elements, and—heat-after-heat—meet the most exacting alloy specifications.

The process is vacuum induction melting, and the *only* specialist in this process is the Metals Division, Kelsey-Hayes Company.

In a specially designed plant which contains seven vacuum induction furnaces with a monthly capacity of 1 million lb, the Metals Division produces over 50 alloys for critical high-temperature, high-stress applications such as aircraft gas turbine buckets and wheels, missile and nuclear components. Alloys like UDIMET 500 and 700 were developed by Metals Division. The Division is the leading producer of vacuum induction melted Waspaloy, M-252, and other alloys.

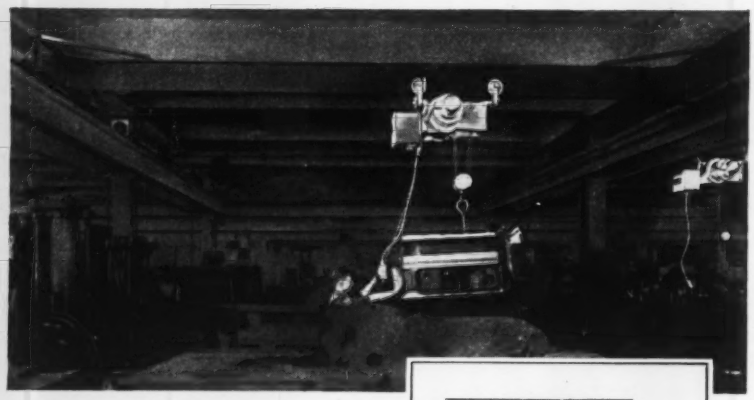
For information on how Metals Division vacuum induction melting facilities and technical experience can meet your superalloy requirements, write Dept. 10, Metals Division, Kelsey-Hayes Company, New Hartford, N.Y.

METALS DIVISION
KELSEY-HAYES COMPANY
NEW HARTFORD, NEW YORK

SHEPARD NILES HOISTS

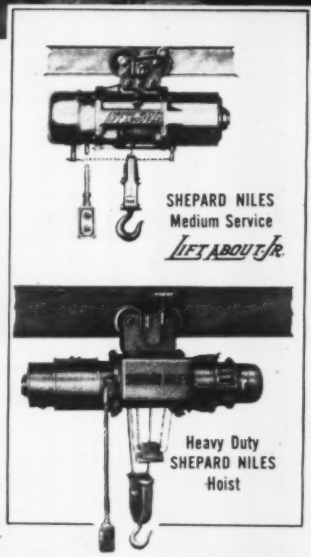
LIFT LOADS

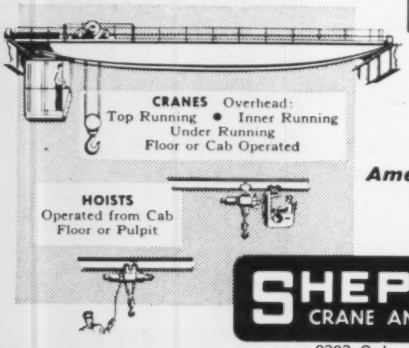
long after they're written off



LOOK FOR YEARS of dependable, trouble-free lifting when you invest in a Shepard Niles Hoist. Because Shepard Niles builds hoists that go on lifting long after you've written their original cost off. This is the kind of performance you expect and get with a Shepard Niles Hoist.

Investigate the complete line of Shepard Niles Hoists . . . choose from medium and heavy capacities with slow, medium or fast speeds. Built for cycle duty, heavy intermittent duty, medium duty and light-occasional service. Short to long lifts, standard or close headroom, manual or magnetic controls.





• Write for latest Bulletin showing Shepard Niles Hoists . . . and request our representative to call.

America's Most Complete Line of Cranes and Hoists Since 1903

SHEPARD NILES
CRANE AND HOIST CORPORATION
2383 Schuyler Ave., Montour Falls, N.Y.

(*Continued from Page* 109)

ity will be erected adjacent to the Mandalay Beach Steam Station of Southern California Edison Co., near Oxnard, Calif. It should be in test operation by November. Cost: About $250,000.

Wettlaufer Line Acquired

C. O. Bartlett & Snow Co., Cleveland, acquired the Wettlaufer line of vibrating screens, packing units, blender mixers, granulators, and centrifuges. Production equipment and laboratory size units for research or pilot plant work are included. The line was developed by W. L. Wettlaufer, Buffalo.

Tube Firm Formed

Tulsa Tube Bending Inc., Tulsa, Okla., has been formed to make thin wall bends of pipe and tubing used in pneumatic conveying and dust collection systems. L. C. Skinner is president.

Bralco Adds Slitting Line

Bralco Metals Inc., Los Angeles, has installed a 48 in. slitting line in its nonferrous metal service center. The equipment is designed to slit aluminum coils weighing up to 10,000 lb and will handle metals from 0.010 to 0.125 in. thick in all available tempers.

Gets Steel Plant Contract

W. W. Clark Corp., Cleveland, has been awarded the electrical construction contract for the second phase of the new stainless steel plant being built by Universal-Cyclops Steel Co., Coshocton, Ohio. Clark recently completed the electrical construction work on the first phase of this new plant which now is in operation.

W. Va. Steelmaker Expands

A $1.6 million expansion of steelmaking facilities is to begin immediately at West Virginia Works, Connors Steel Div., H. K. Porter Company Inc., Huntington, W. Va.

Plans call for installation of a new electric furnace and two soak-

4 Types of Multi-Unit Automatics for High Production to Close Tolerances

Each of these four machines on our assembly floor is a different type. Each one is the most efficient setup for its particular job.

But these different types of machines are alike in these ways —

- **Operations.** Drill, counterbore, ream, tap, mill (light cuts), etc.
- **High production.** A number of automatic units of ½ to 5 hp each perform different operations at the same time.
- **Close tolerances. Few rejects. Little downtime.** Each machine has good basic design and rugged accurate construction.
- **Ready to produce.** Samples run for approval before shipping machine.

For a specific proposal ask our representative in your area. Or write us. Kingsbury Machine Tool Corp., Keene, New Hampshire.

REPRESENTATIVES

California	Los Angeles 22	Moore Machinery Co
Connecticut	West Hartford 7	O C Stevens Mchy Co
Illinois	Chicago 51	Four States Mchy Co
Indiana	Indianapolis 20	C C Garrett Mchy
Michigan	Detroit 19 Grand Rapids 4	Birmingham & Conner Joseph Monahan
Missouri	St. Louis 24	R R Stephens Mchy Co
New York	Long Island City Syracuse 1	Triplex Mach Tool Co Syracuse Supply Co
Ohio	Cincinnati 2 Cleveland 3 Dayton 2	E A Kinsey Co Golden & McCoy Co C H Gosiger Mchy Co
Pennsylvania	Philadelphia 6 Pittsburgh 37	John S Wright, Mchy Merit Machinery Inc
Canada	Toronto 8	Barker Indus Eq Ltd

REGULAR INDEXING

For most high production work. Perform successive operations from one direction or several. Index units in four sizes: 12-, 20-, 26- or 40-inch. Four to 10 stations (12 with 40-inch).

CENTER COLUMN INDEXING

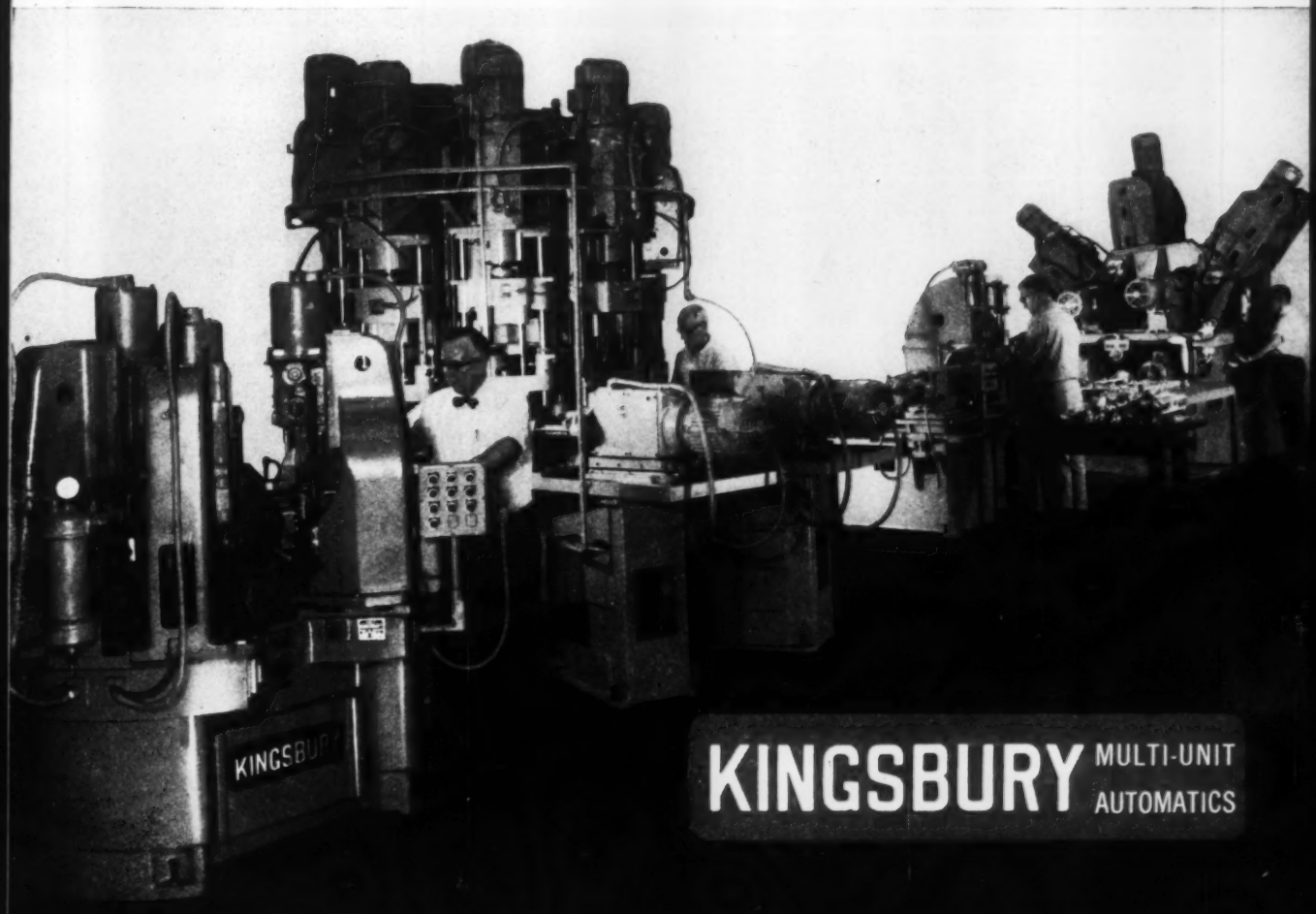
For more operations or larger parts than the regular indexing machines can handle. 8 to 14 stations. 43- or 63- inch index table. Horizontal units mounted on knees. Easy access to tools.

NON-INDEX (WAY TYPE)

For operations from 2 or more directions on one part at the same time. When a job needs successive operations, two or more of these machines may make the most efficient setup.

VERTICAL INDEXING

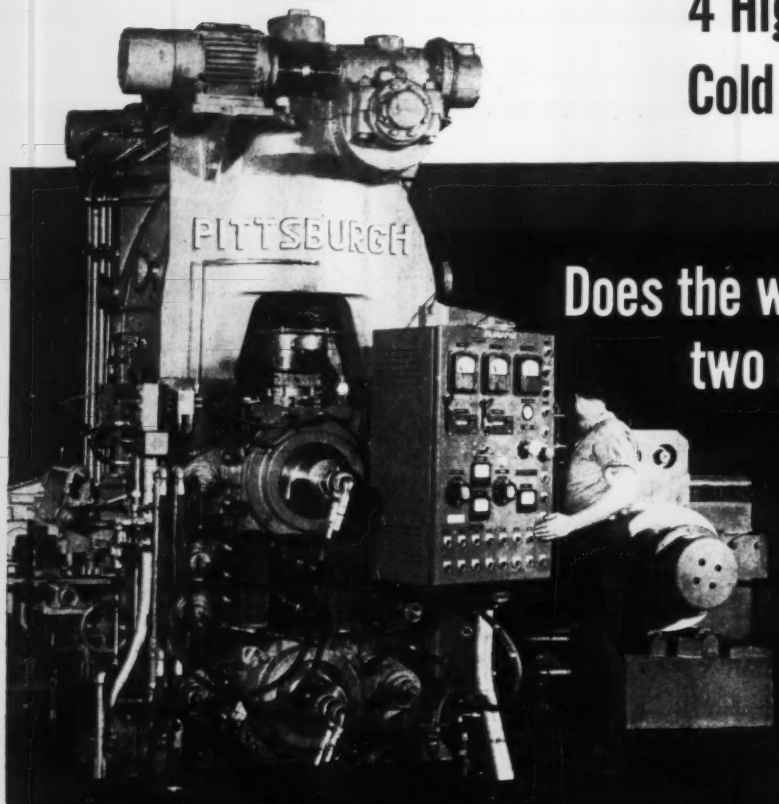
For successive operations from opposed directions with up to 5 horizontal units on each side of the machine. Up to 4 radial units provide a third direction. 8 stations in a vertical plane.



KINGSBURY MULTI-UNIT AUTOMATICS

PITTSBURGH

Combination 4 High/2 High Cold Mill . . .



Does the work of two separate mills

"Precision" and "Versatility" are the words that best describe the new combination 2 High/4 High Cold Mill designed and built by PITTSBURGH to secure precision gauge, temper and finish for the ferrous and non-ferrous industries. As a 4 High Mill, it is used for cold reducing; as a 2 High Mill, it is used to acquire the desired temper and finish. Several desirable design features are incorporated to keep roll change time to a minimum. Low initial cost and economical operation are attractive plus values.

"Electric and open hearth steel castings from 1 lb. to 100 tons"

HEAVY MACHINING FACILITIES

Our plant is equipped with a superior complement of well diversified machine tools that are available on a continuing basis for economical machining of heavy castings or the manufacture of auxiliary rolling mill equipment, such as heavy mill tables, furnace pushers, slab depilers, downcoilers, ingot buggies, slab transfers, etc.

PITTSBURGH
ENGINEERING & MACHINE DIVISION
Pittsburgh Steel Foundry Company
TEXTRON, INC.

BOX R, GLASSPORT, PENNSYLVANIA • PLANTS AT GLASSPORT & McKEESPORT, PA.

ing pits, erection of a craneway for a new 30 ton crane, and enlargement of the furnace building services and facilities to accommodate the new equipment. Completion target: June 1, 1960.

This is the second major expansion at the works since Porter acquired the plant in 1956.

CONSOLIDATIONS

Leland Electric Motor Div., American Machine & Foundry Co., Dayton, Ohio, has been sold to **Howell Electric Motors Co.,** Howell, Mich. The sale does not include Leland Airborne Products Div., AMF, Vandalia, Ohio.

Sand Blast Equipment Div., Leiman Bros. Co. Inc., Newark, N. J., has been bought by **Pressure Blast Mfg. Co. Inc.,** Manchester, Conn.

Thompson Ramo Wooldridge Inc., Los Angeles, acquired **Bel Canto Stereophonic Recordings Inc.,** producer of prerecorded stereo tapes and stereo disc recordings.

Gear Grinding Machine Co., Detroit, has been acquired by **Michigan Tool Co.,** Detroit. The firm will be operated as the Gear Grinding Machines Div., with headquarters at 7171 E. McNichols Rd., Detroit.

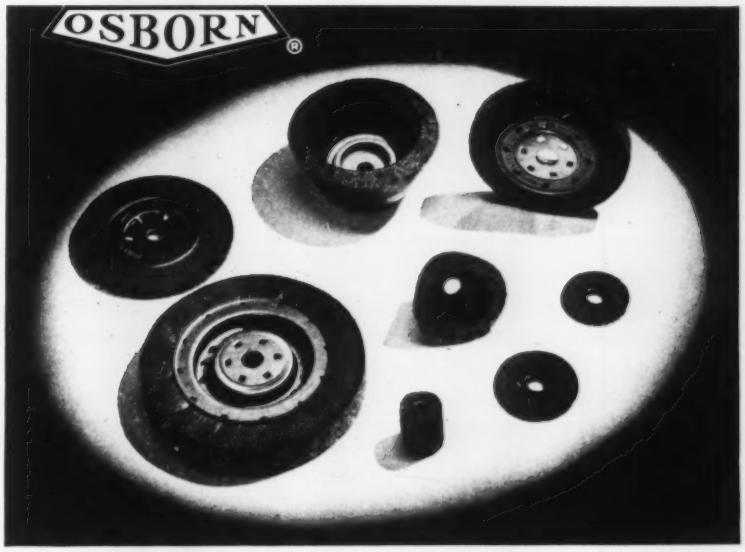
Bellows Co. Div., International Basic Economy Corp., Akron, has purchased **Jackson Electronic & Mfg. Co.,** also of Akron.

Peerless Electric Co., Warren, Ohio, maker of fans and blowers, has been sold to **H. K. Porter Company Inc.,** Pittsburgh.

General Electronic Control Inc., Minneapolis, has bought **Hi Products Inc.,** Richfield, Minn., producer of power distribution and control equipment.

Atlas Mineral Products Co., Mertztown, Pa., has reached an agreement whereby all of the capi-

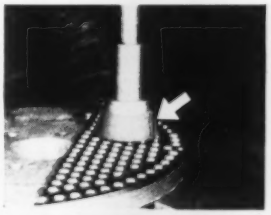
(*Please turn to Page* 118)



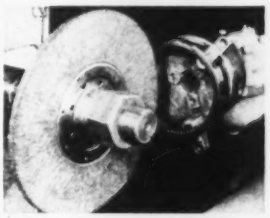
Here's how

JOB-PROVED TY® BRUSHES

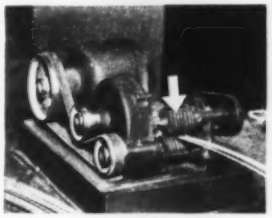
are cutting metal-finishing costs across the board



Application: deburring



Application: Surface finishing



Application: wire insulation stripping

In use today on a wide range of applications—Osborn TY® Tool Brushes are *engineered to cut finishing costs.* New TY Brushes are designed for jobs *beyond the reach* of standard wire power brushes.

Where rotary files, abrasive stones or belts, tumbling and shot blasting equipment have been used—TY Brushing Methods now do many of these jobs better and faster . . . at significantly less cost.

Do you know which operations in *your plant* can be done at high production rates . . . with better quality control . . . at less cost with new TY Brushes? An **O**sborn **B**rushing **A**nalysis—made in your plant now at no cost—is the first step. Write for full details.

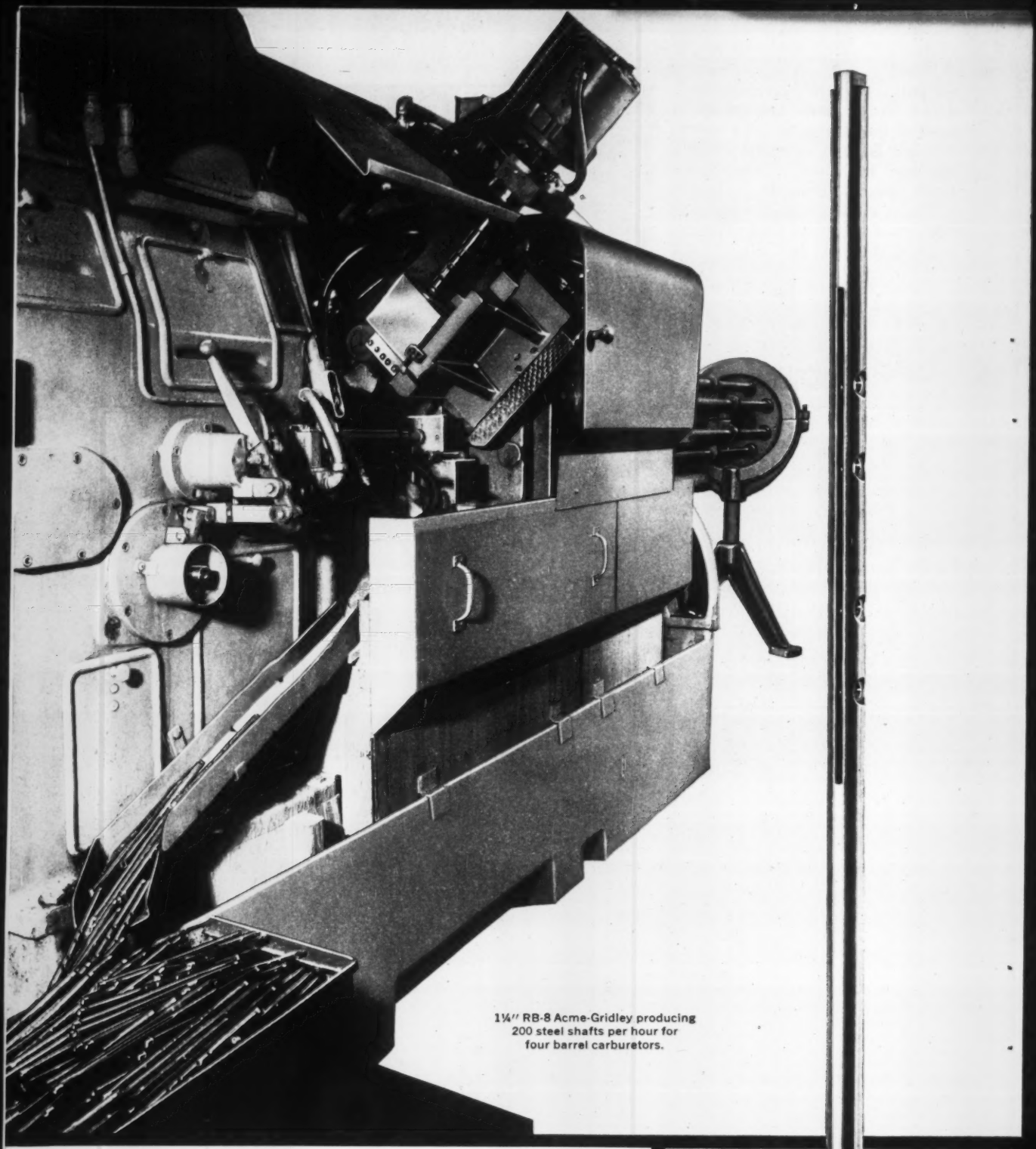
Exclusive TY Brush advantages performance proved on-the-job:

- Maximum of work efficiency with minimum of pressure.
- Greatly increased brushing action strength.
- Positive control over area of brush contact.
- Complete uniformity of finish.
- Exceptionally long brushing tool life.

Write For Free TY® Brush Booklet... complete, illustrated application and specification data for production men. *The Osborn Manufacturing Company, Dept. S-13, Cleveland 14, Ohio.*

Osborn Brushes

POWER, PAINT AND MAINTENANCE BRUSHES
METAL FINISHING MACHINES...AND FINISHING METHODS
FOUNDRY PRODUCTION MACHINERY



1¼" RB-8 Acme-Gridley producing 200 steel shafts per hour for four barrel carburetors.

NATIONAL ACME'S "ZONE OF RESPONSIBILITY"

INCLUDES ALL PHASES OF COST REDUCTION

Check YOURS . . . Then Check National Acme

Direct Costs: these include direct dollar savings as realized by Carter Carburetor . . . an "every day" job for Acme-Gridleys.

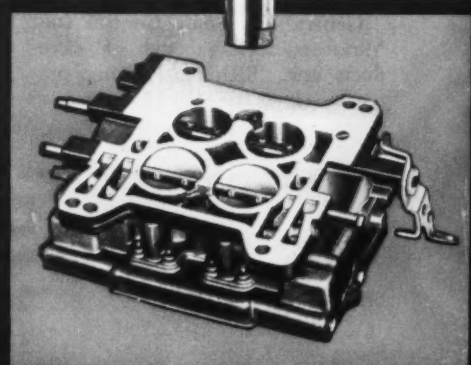
Indirect Costs: effecting important savings in maintenance, downtime, scrap reduction, tool costs, etc.

Product Redesign: teaming with your design group to take full advantage of Acme-Gridleys' cost reducing capabilities.

Direct Material Costs: our engineers provide important savings in this area by constantly matching machines and tools to modern metallurgical problems.

Make-or-Buy Reviews: in many cases our Contract Division can assume your production headaches and relieve you of immediate capital investment.

Spot Modernization: pioneering in modern tooling methods, and the flexibility of Acme-Gridleys can provide many "on-the-spot" savings.



Versatile Acme-Gridley produces

EIGHT DIFFERENT PARTS

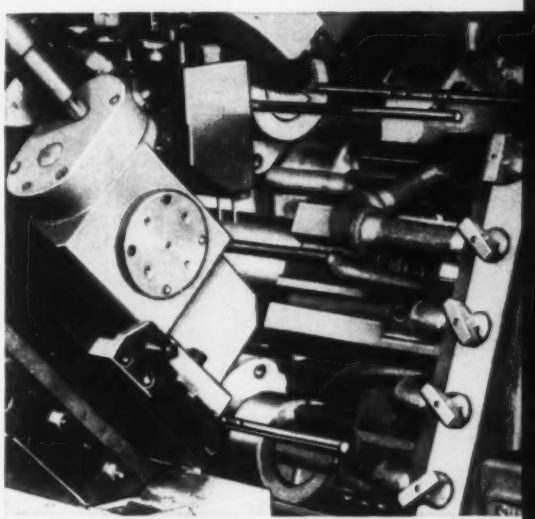
With Only Minor Changes in Tooling Setup

For Carter Carburetor *division of ACF Industries, Inc.*

Here's machine tool versatility at its best . . . versatility that provides documented cost savings for Carter Carburetor year in and year out. Machine investment and cost-per-piece are greatly reduced. Illustrated is but one example.

The spindles of a standard 1¼" RB-8 spindle Acme-Gridley bar automatic were locked against rotation with a simple spindle locking device. Each spindle functioned as a work holder when the machine indexed from position to position. The inherent accuracy of Acme-Gridleys assured precise alignment of the work with the standard and special attachments . . . whether it's the first or last piece in the run. When spindle rotation is desired, the locking device is simply removed and replaced by the spindle drive gear.

Check the industry's most modern approach to tangible cost reduction. Call, write or wire today!



Close-up of tooling zone showing milling of slot in 4th position.

Pioneer in Circumferential Automation

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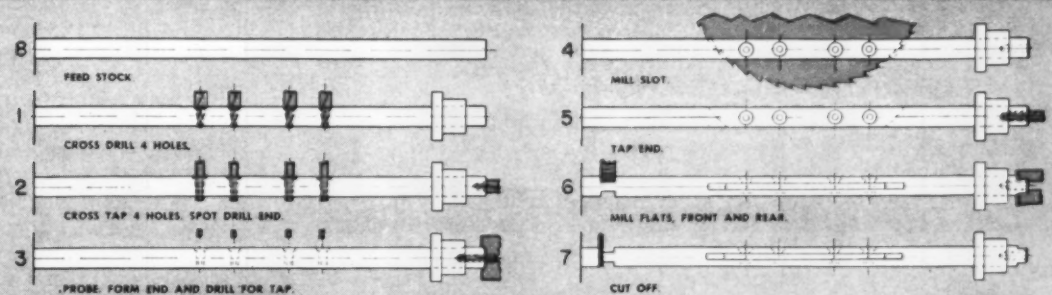
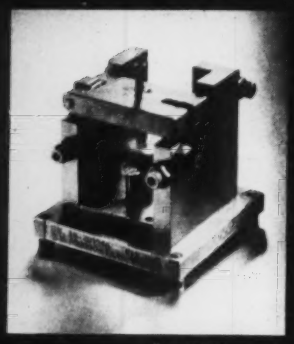


Tooling with tape...



This drill jig: $280.00

This drill jig: $4.20

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(*Continued from Page* 115)

tal stock of **Chemical Linings Inc.**, Watertown, N. Y., will be acquired by **Electric Storage Battery Co.**, Philadelphia, of which Atlas is a wholly owned subsidiary. Chemical Linings will be supervised by Atlas, but present management is to be retained. Electric Storage has also purchased **Wisconsin Storage Battery Co.**, Racine, Wis.

NEW PLANTS

A new high voltage development laboratory has been put in operation at the **Kelman Power Circuit Breaker Div.**, Los Angeles, I-T-E Circuit Breaker Co. The facility, capable of surge testing up to 1.5 million volts, also incorporates the only high current testing setup on the West Coast, the company reports.

Scott Aviation Corp. will start expansion of its Lancaster, N. Y., plant. The addition will cover nearly 10,000 sq ft. Cost: $100,000.

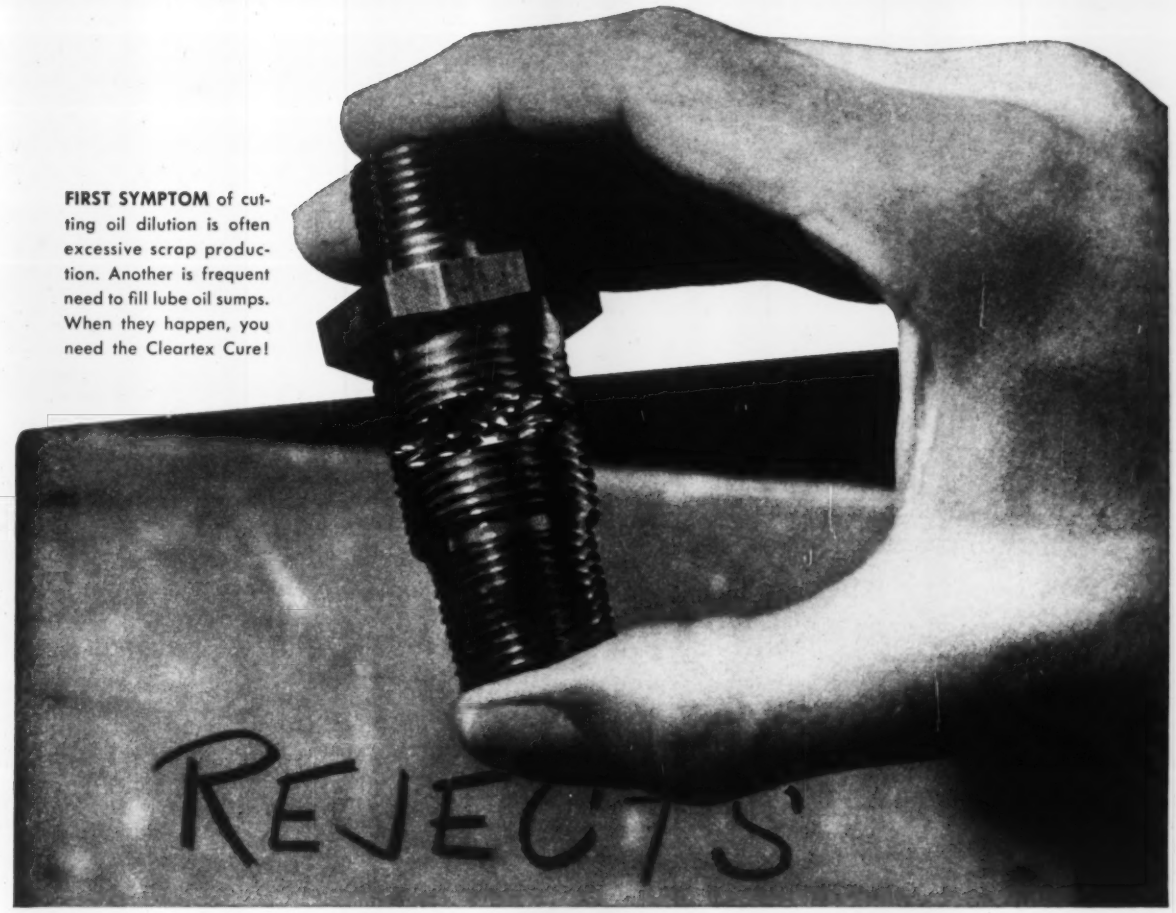
Harrison Radiator Div., General Motors Corp., Lockport, N. Y., has started building a 180,000 sq ft warehouse and a 200,000 sq ft manufacturing facility at its West Lockport, N. Y., plant.

Mansfield Sanitary Inc., Perrysville, Ohio, has completed a 15,000 sq ft Brass Sales Div. office in that community.

AC Spark Plug Div. of General Motors Corp. will add 215,000 sq ft to its Oak Creek, Wis., missile guidance plant.

A radioisotope laboratory, equipped and staffed for basic research and industrial applications of radioisotopes, has been installed by **Evans Research & Development Corp.**, New York. Major activities will be in the areas of radiochemistry and nuclear instrumentation.

Allvac Metals Co., Monroe, N. C., custom vacuum melters, has started a building program which will double its floor space. The company is also separating its Anilco melting facilities for a popular mag-



FIRST SYMPTOM of cutting oil dilution is often excessive scrap production. Another is frequent need to fill lube oil sumps. When they happen, you need the Cleartex Cure!

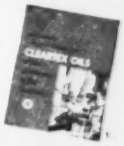
Diluted cutting oil can pile up rejects

When you find your scrap production soaring, the villain may be lube oil leaking into the cutting oil sumps of your automatic screw machines. It happens in 7 out of 10 automatics in spite of the most careful lubricating techniques. This dilution will lower cutting oil effectiveness—and, as it loses its efficiency, rejects pile up, tool life drops, and production can go down by as much as 33 per cent!

Texaco Cleartex can solve the problem—forever!
Because of its exceptional stability and load-carrying ability, Cleartex can function *both* as a cutting oil *and* as a lubricant —and even as a hydraulic fluid. When *all* your automatics' sumps are filled with Cleartex, unavoidable leakage is no longer a problem. Excessive scrap production will stop, tools will last longer and production will go up.

TAKE THE "CLEARTEX CURE" SOON!
Write today for your copy of Texaco's new booklet—"Cleartex in Automatic Screw Machines." This new illustrated guide will fill you in on the details, show you where you may be losing profits and how to avoid it. Or contact your local Texaco Lubrication Engineer for an authoritative survey of your automatics. Just call the nearest of the more than 2,000 Texaco Distributing Plants, or write:

Texaco Inc., 135 East 42nd Street, New York 17, N. Y., Dept. S-FM-32.



☆ ☆ ☆

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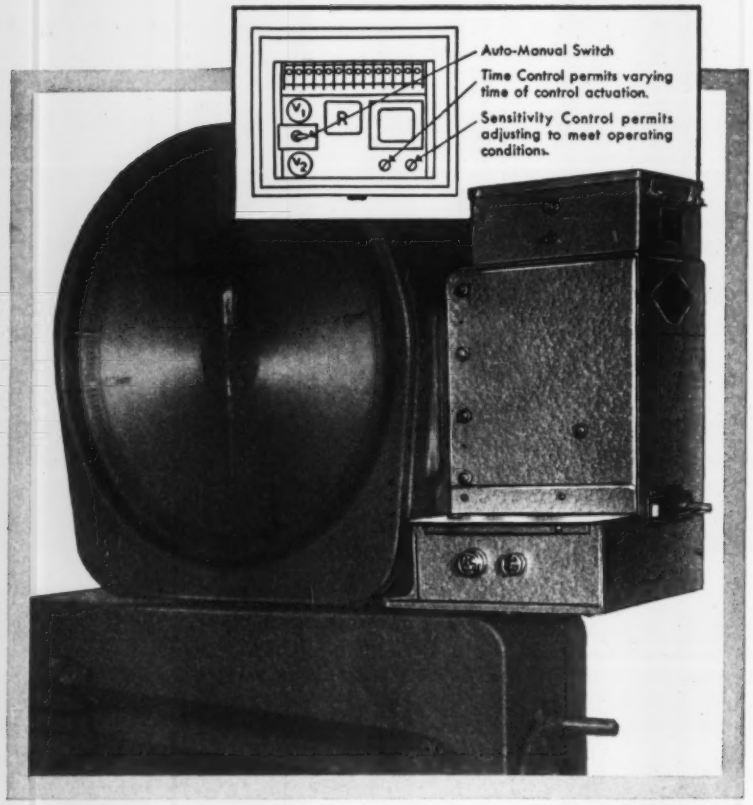
LUBRICATION IS A MAJOR FACTOR IN COST CONTROL
(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

NEW Fairbanks-Morse Electronic Weight Detector


Auto-Manual Switch
Time Control permits varying time of control actuation.
Sensitivity Control permits adjusting to meet operating conditions.

Prevents incorrect weighing . . . stops costly errors!

With the new Electronic Weight Detector, true weight of any load can be automatically obtained and recorded without need of a weighman. Where a weighman is used, it is impossible for him to record incorrect weights or start a sequence at the wrong time. When desired, a flip of the switch can disengage the Weight Detector entirely from the system. *This is the first fully-reliable control of its kind available in the scale industry.*

To completely automate your weighing—to be sure that your weights are correct—to protect yourself by completely policing your entire weighing operation—contact your nearby Fairbanks-Morse Field Engineer, or write directly to Fairbanks, Morse & Co., 600 South Michigan Ave., Chicago 5, Illinois for complete information.

See Sweet's Plant Engineering File for full line of F-M Scales

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SCALES • PUMPS • DIESEL, DUAL FUEL AND GAS ENGINES • ELECTRIC MOTORS
GENERATORS • COMPRESSORS • MAGNETOS • HOME WATER SYSTEMS

net material from its high temperature alloy melting operations. The firm expects to have a 3500 lb induction melting furnace in operation this year in addition to the 1500 lb furnace already in production.

Branson Ultrasonic Corp., Stamford, Conn., has begun a 12,000 sq ft expansion to its 24,000 sq ft building (completed three years ago) at 40 Brown House Rd.

Speed Queen Div., McGraw-Edison Co., Ripon, Wis., has revealed plans for a $1 million expansion program which includes the construction of a 14,000 sq ft warehouse, installation of new heavy equipment, and modernization of plant and office facilities.

Sylvania Electric Products Inc., Towanda, Pa., has begun construction of a 6000 sq ft facility for fabrication of tungsten, molybdenum, and other refractory metals used in high temperature applications such as rockets, jet engines, and industrial furnaces. The new structure will contain fabricating and heat testing equipment to augment Sylvania's isostatic pressing and reduction furnace operations. It is scheduled for completion early in 1960.

Eutectic Welding Alloys, Central Div. Inc., has opened a new service center and warehouse at 4353 S. Kedzie Ave., Chicago.

Fischer Bearings Mfg. Ltd. is building a 52,000 sq ft addition to its Stratford, Ont., plant. Cost, including equipment, will be around $1 million. The addition will contain a production system for water pump spindle bearings. Fischer is a subsidiary of Kugelfischer George Schafter & Co. of Germany.

Construction has begun on **Raytheon Co.'s** sixth building to be located on Route 128, Boston's "Electronics Highway." The new building contains 30,000 sq ft and will house the firm's Special Microwave Device Subdivision.

Lewyt Mfg. Corp., New York, has started building a $250,000 research and development laboratory at its Long Island City, N. Y., plant.

AMERICA'S LARGEST STEEL MILLS USE BROWNING CRANES

Built to A. I. S. E.
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For years, Victor R. Browning & Co. has devoted major time and study to the building of heavy duty mill cranes. The finest materials and workmanship go into the construction of these cranes. All shafts are of the highest quality alloy steel. All bearings are calculated with a proper life factor as required by the A. I. S. E. We will design to suit your special requirements or build to your specifications . . . Victor R. Browning & Co. also makes a complete line of trolleys which can be adapted to existing bridges.

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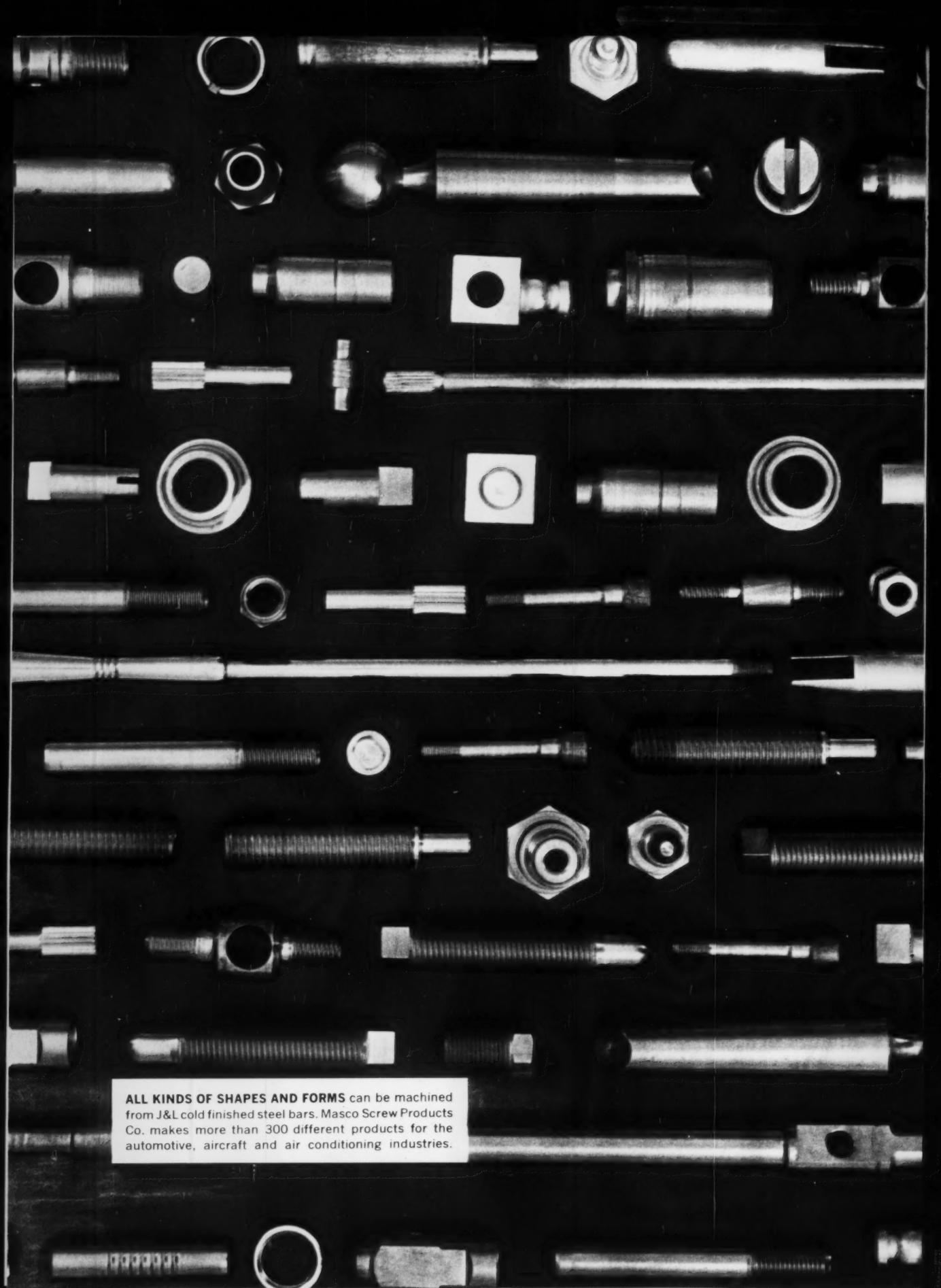
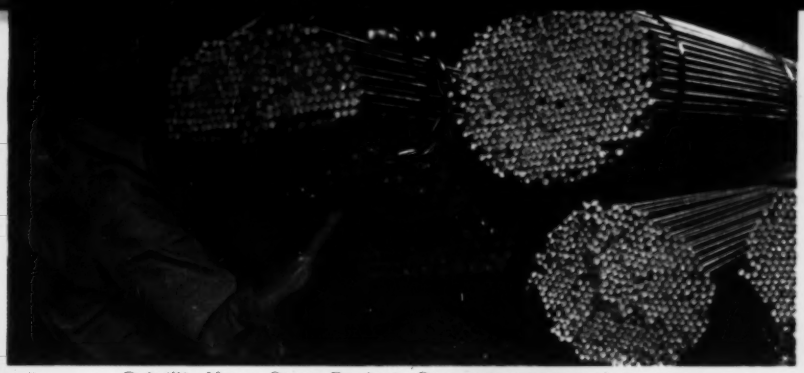
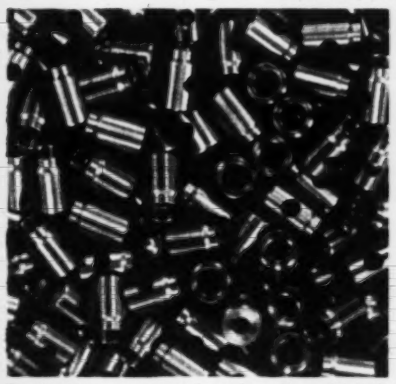


ALL KINDS OF SHAPES AND FORMS can be machined from J&L cold finished steel bars. Masco Screw Products Co. makes more than 300 different products for the automotive, aircraft and air conditioning industries.



Detroit's Masco Screw Products Company uses round, square and hexagonal J&L leaded steel bars in sizes from ⅜" to 1⅛"

More than 96 automatic screw machines are in almost constant operation



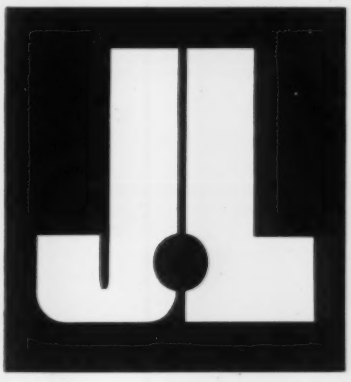
Production runs vary from less than 10,000 to more than 2,500,000 pieces

Even complex machining operations have fewer work stoppages with free machining J&L leaded steel

Parts are often so smooth after routine machining that no further finishing is necessary

Rigid Masco inspection procedures assure products of dependable quality

Masco regularly handles specifications calling for dichromate, chromium, and other protective coatings



"J&L leaded steel bars machine at maximum practicable speeds for screw machines"

. . . reports Masco Screw Products Company

"While we're seldom able to run our automatic screw machines at their maximum rated speeds, we've found that J&L leaded steel bars permit the fastest machining speeds practicable," says Alex Wood, plant engineer of Masco Screw Products Company, Detroit's largest independent manufacturer of screw machine products.

"The free machining properties of this J&L cold finished steel permit high speed production. The short length chips minimize tool edge build-up. Tool wear is reduced. And, frequently, fewer finishing operations are needed.

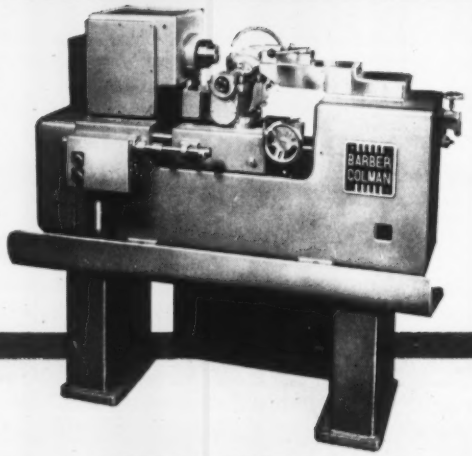
"This is a good steel for screw machine products."

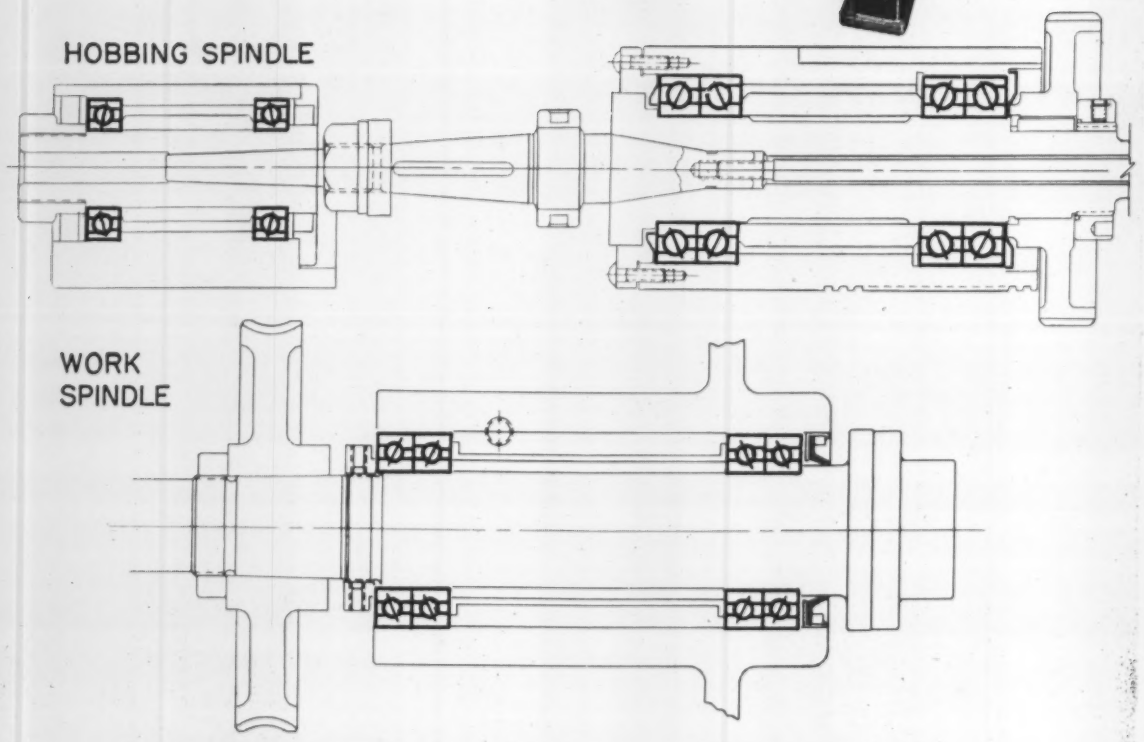
Jones & Laughlin Steel Corporation

PITTSBURGH, PENNSYLVANIA

Where cold rolled steels originated in 1859

Barber-Colman 2½-4 Hobbing Machine hobs precision instrument spur gears up to 2½" in diameter, 2¼" in length. Efficient design features vertical hob spindle adjustment; swivel hob mounting; antifriction way bearings, self-contained, recirculating oil lubrication.





Relative rotation of hobbing machine spindles held accurate within 20 seconds using Fafnir Ball Bearings

New Barber-Colman 2½-4 machine precision-hobs spur gears for instruments

If two words can sum up the design of Barber-Colman's new 2½-4 Hobbing Machine, they are *accuracy* and *rigidity*.

Developed for hobbing AGMA Precision Class 3 fine-pitch spur gears for guidance systems, the 2½-4 has a minimum number of parts at points where deflection or inaccuracies might occur.

In selecting bearings which would complement the accuracy of the gears in the machine, Barber-Colman designers got the performance they wanted with Fafnir super-precision ball bearings. Single row, extra-light, counter-bore types, eight used in duplex pairs, help maintain indexing accuracy within *20 seconds*.

The application is typical of thousands Fafnir has handled where performance requirements put an extra premium on bearing selection. Chances are, Fafnir experience — plus breadth of line — can answer bearing problems you may have. Write The Fafnir Bearing Company, New Britain, Connecticut.

FAFNIR
BALL BEARINGS

10 Fafnir Extra-Light Super-Precision Ball Bearings, snug fit, support the Barber-Colman 2½-4 machine spindles. 4 variations, equipped with composition retainers, are available in this one series to meet specific load and speed requirements where exceptional rigidity is wanted.

FUTURE OF PAINT— Water reducible paints will overtake and replace today's products, predicts George S. Forbes, industrial sales manager, Glidden Co., Cleveland. He says they'll do a better job and be much safer to use.

TRANSLUCENT ALUMINUM OXIDE— Development of a clear ceramic called Lucalox is expected to accelerate scientific, military, and industrial uses of ceramics, says the developer, General Electric Co., Schenectady, N. Y. The material is said to be quite strong, is easy to fabricate, and has exceptionally high heat resistance (it is stable at 3600° F).

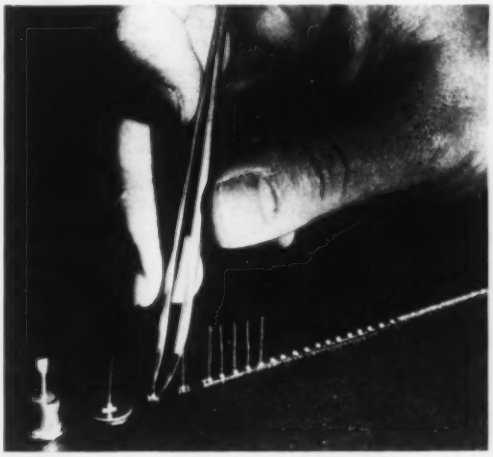
EXTRUSION CUTS SCRAP—Rare metals such as those being used in nuclear reactors and similar devices can be formed more easily by extruding rather than machining—a practice which is showing savings in scrap losses, states R. A. Quadt, vice president and director of research, Bridgeport Brass Co., Bridgeport, Conn.

RECORDS CREEP AUTOMATICALLY— A new device designed by research people at Stanford Research Institute, Menlo Park, Calif., makes a permanent record of creep deformation on a strip chart recorder. It produces a curve in one day that normally requires two weeks with more conventional equipment. It is also said to be accurate to 0.005 in.

TINY COOLER— A superrefrigerator the size of a flashlight battery can chill objects to minus 350° F in a few minutes. (The device uses compressed helium.) Many military and industrial applications are predicted by Arthur D. Little Inc., Cambridge, Mass.

ROCKETS FOR THE WORKBENCH— Small rockets, similar to those which propel sky giants, can do practical shopwork (as heat sources) cheaply, speculates Albert E. Weller, Battelle Memorial Institute, Columbus, Ohio. Suggested uses: Paint stripping, cutting and piercing of metals, glazing flame-sprayed ceramics, and as a heat source for hot machining of metals.

BETTER INSULATING VALUE— A new asbestos cloth coated with aluminum foil is interesting ship and aircraft builders, claims Aluminium Ltd., Montreal, Que.



CONTINUOUS GERMANIUM CRYSTAL, similar to continuous casting, will bring about completely automatic manufacture of transistors, says Dr. S. W. Herwald, vice president-research, Westinghouse Electric Corp., Pittsburgh. Conventional crystals are thick, round pieces which must be sawed and polished to size, an expensive, wasteful process. The new technique grows crystals to the exact size and shape needed. Similar methods sought for heavier metals may lead to products with a tensile strength over 1 million psi

BETTER SEAL FOR FOUNDRY BOXES— Nitrile rubber makes a good, tough seal for coreboxes, says Dike-O-Seal Inc., Chicago. It is said to be an excellent solution for any application involving high temperatures, abrasive and corrosive cleaning compounds.

How We Beat the Cost Crisis

How Purchasing Can Trim Your Raw Material Costs

14 Ways to Save

1. Order in most economical quantities.
2. Substitute one material for another.
3. Standardize on kinds, types, sizes.
4. Initiate changes in specifications, tolerances.
5. Do value analysis.
6. Give make or buy recommendations.
7. Negotiate purchases with venders.
8. Select cheapest transportation for incoming shipments.
9. Buy in form most suited to production.
10. Use sound inventory control.
11. Uncover new products, supply sources.
12. Use sound vender selection and scientific ways to measure their performance.
13. Make disposal of scrap economical.
14. Simplify packaging, handling of incoming orders.

5 Ways to Lose

1. Doing business with the wrong supplier.
2. Buying too much.
3. Buying too little.
4. Ordering better material than you need.
5. Failing to give vender detailed specifications.

Saving of $100 on supplies could have the same effect on profits as a $1000 increase in sales. Here are several ways you can cut expenses and boost income

ANY INVESTIGATION of how to cut the costs of raw materials either begins or ends with purchasing. This key department, in co-operation with production, engineering, quality control, and the host of other manufacturing functions, can add dollars to the black ink side of your ledger in these Cost Crisis years.

• **Its Importance**—Here's a hypothetical case illustrating purchasing's worth. The speaker is Willard F. Rockwell Jr., president, Rockwell Mfg. Co., Pittsburgh:

"A firm is doing a $50 million a year business, spending 50 per cent of the sales dollar on purchases, and making a profit before taxes of 10 per cent of the sales dollar. A $10 million increase in sales would be a tremendous thing and cause for a great deal of celebration. However, a $1 million decrease in the cost of purchases would have the same effect on profits. In fact, many firms are finding that a 4 per cent saving in the cost of purchases is equal profitwise to a 20 per cent increase in sales."

• **Purchase for Profit** — How can you cut costs in the raw materials area? On this and the next three pages are some case histories revealing what some of your competitors are doing.

Take this case, as outlined by C. Warner McVicar, vice president of purchasing for Rockwell, of how value analysis saved over $11,000.

The part is a small copper alloy spacer ring to position components of a meter. Purchasing is required to order the part since Rockwell doesn't have a bar machine large enough to machine it. The best price (per piece) that can be obtained is 60 cents. Milling, drilling, and pinning operations in the Rockwell plant raise the cost to $0.6607.

Purchasing keeps looking for a cheaper way to make the part. It comes up with a vender who can supply an aluminum spring (fabricated from standard size wire) that will do the job. His price: $0.04165 each in lots of 5000. Since Rockwell's average yearly consumption is 18,000, its annual saving is $11,192.

• **Buying to Save**—Sometimes you have to spend to save. That was the case at Federal Pacific Electric Co., Newark, N. J. In fabricating electrical enclosures, the procedure was to buy carbon steel sheets, shear them to the proper dimensions, and send them through several press operations (as many as 30).

Jefferson J. Vorzimer, director of

purchasing, reasoned that heavy savings would result if a continuous coil of steel could be used. That meant new equipment. Management bought the idea and spent $500,000 to install new presses. One press with a progressive die now does the whole operation. Another refinement has been added: Purchasing found it would be more economical to buy welded sheet coil. Reason: The larger coils cut press downtime since the operator doesn't have to stop frequently to change coils.

Results: Labor costs were reduced 25 per cent. Production runs were stepped up sharply. Dollar savings that run well into six figures yearly.

• **Opportunities Galore** — Chances to save on material purchases crop up everywhere. Standardization of acetylene cutting tips to a single specification in lieu of numerous brandnames has resulted in a saving of about $8000 a year for Columbia-Geneva Steel Div., U. S. Steel Corp., San Francisco. In another instance, a buyer standardized on minimum factory runs for 3, 8, 10, and 16 conductor cable in lieu of small variable quantities, with resultant savings of $28,008 annually, H. W. Christensen, director of purchases, told a recent American Management Association meeting. Standard item descriptions, nomenclature, and industry standard numbers have enabled Columbia-Geneva to reduce the purchase cost of many items as much as 40 per cent.

At Federal Pacific, purchasing received a requisition to buy some drawn edge copper. Instead, it ordered slit edge copper at a saving of 3 to 4 cents a pound—the substitute was as satisfactory as the material it replaced. Says Howard Ahl, executive secretary, National Association of Purchasing Agents: "Reduction of specifications (and tolerances) in co-operation with other departments is an area that should be stressed. It abounds with opportunities for savings through purchasing."

At Fansteel Metallurgical Corp., North Chicago, Ill., purchasing (in co-operation with shipping) has developed palletized shipping that will save at least $20,000 a year in packing expenses, plus large labor savings by minimizing packing time,

Costs Reduced $125,000 on F-106

Convair formerly purchased its aluminum for wing skins in the form of a rolled tapered mill product, explains buying supervisor, Jordan Barraclough. Extensive finishing was required—closer tolerances were made necessary by weight and aerodynamic problems.

Convair found the mill could deliver a virtually finished product—to the close tolerances specified—and could do it less expensively than either Convair or a subcontractor could.

Savings: $200,000 To Date

Cites buying supervisor, Harry Warn: For the aluminum forgings used throughout the airframe, Convair used to buy a blocker-type forging—heavy bar stock blocked out to configurations. Purchasing discovered that by paying a higher first price for precision aluminum forgings it could eliminate a lot of expensive machining operations and tooling.

Savings: $300,000 To Date

Convair Saves $500,000 on 600 Series

This F-106 all-weather interceptor, being built by Convair for the Air Force, specifies a titanium-aluminum-tin alloy ($15 a pound) for engine and firewall shrouds. Purchasing found, relates Mr. Warn, that it could discontinue buying standard size mill sheets, which had to be trimmed. It had the mill trim to specifications, allowing for minimum factory scrap and only that surplus dimension needed for holding and clamping—all at no extra cost. Purchasing also decided to have the vender cut identifiable test coupons (for quality control tests) from mill rolls for $1 each—formerly, as much as one-tenth of a sheet was ruined in cutting test coupons after delivery of the material to the factory.

Three Tips from GE

A company that spends $2 billion yearly on materials, components, and services from some 45,000 suppliers has to be continually alert to cost reduction through purchasing. Charles B. Adams, manager-purchasing service, General Electric Co., lists three typical cases where GE purchasing people initiated heavy reductions in raw material costs:

Consolidating Purchases Saves over $125,000 Annually

Following the GE system of decentralized purchasing, each plant is normally responsible for buying its raw materials. Typically, each of the three semiconductor plants writes its own contracts for the purchase of argon (used to prevent oxidation in germanium and silicon crystal growth).

Purchasing service, in co-operation with plant purchasing agents, found that the argon market was weak nationally because of overproduction in the industry; but no single plant could take advantage of the market. Solution: By negotiating a three year contract and combining purchases for the three plants, GE was able to initiate savings that exceeded $125,000 a year. Moral: Follow the market and take advantage of it to cut costs in the purchase of raw materials.

New Supplier Saves $100,000 Annually

The Louisville appliance plant formerly bought about 30 tank cars of phosphoric acid a year for bright dipping of aluminum used in refrigerator shelves. Purchasing uncovered a supplier with a material capable of reducing the aluminum ion content, permitting use of the baths for longer periods. Result: Phosphoric acid requirements were reduced 60 per cent, bringing an annual saving of $100,000. Moral: A continuing search for suppliers with new products and processes can drastically reduce the cost of raw materials.

Salvaging 'Spent' Material Saves over $50,000 Annually

The Steam Turbine Dept. at Schenectady, N. Y., buys ⅛ in. asbestos paper that's used to cover the turbine shells when they are heated prior to filling casting faults. Formerly, the paper was thrown away after use.

Purchasing decided to look for a way to salvage some of its yearly paper requirements (1.25 million lb). It found a small paperboard processor who could reprocess the spent material. Annual savings: Over $50,000.

says Joseph A. Teece, vice president and director of purchases.

Ordering in the most economical quantities is basic to profitable raw material purchasing. In most cases it would be a mistake, explains Mr. Ahl, to buy a half ton of material every two weeks when you could buy it in 2 ton lots at 8 cents a pound less, if the cost of carrying the additional inventory doesn't override the savings.

Don't discount savings that can be made through purchasing a more expensive material—especially when it will reduce steps in such operations as machining and finishing. For example, says Mr. Ahl, suppose you substituted a 20-cent-a-pound material for a 10-cent-a-pound one, but the higher priced material brought a reduction in machining costs of 15 cents a pound. Or perhaps you might be buying a light bulb for 75 cents that will last 1000 hours when you could purchase one for $1 that has a life expectancy of 2000 hours.

• **Where to Buy**—Perhaps no other purchasing decision can be so rewarding from the standpoint of cost savings as the choosing of suppliers. Here are some of the ways that risks can be minimized and opportunities for cost reductions boosted:

Investigate the supplier. Look at his capabilities, facilities, financial status, labor relations, reputation for deliveries and quality. Check the extra services he offers, such as engineering and design assistance. Take a trip through his plant.

"Keep a close watch on stability of service," cautions Charles B. Adams, manager-purchasing service, General Electric Co., New York. Don't reorder from a company where experience has shown that you can only use 75 per cent of the material and will have to return the other 25 per cent for rework. If you have to shut down machines, your costs will build up pretty fast."

Have venders submit bids when you plan to place a sizable order. Advises Ralph I. Condon, purchasing manager, Twin Coach Co., Buffalo: "We don't limit ourselves to the conventional three-bid system. Sometimes, particularly on subcontracted and other major items, we issue as many as 16 invitations to bid."

Analyze what the material you are buying should cost (after allowing for adequate profits). Then go to the vender and compare your figures with his. Odds are he may be 10 to 20 per cent higher, which gives you ammunition for negotiating a price considerably lower than his bid.

Check every source of supply. Twin Coach says it often buys materials from surplus houses at reduced prices and has found that raw materials in quantities under 1000 lb can be more economically purchased from warehouses than from mills.

Norma-Hoffmann Bearings Corp., Stamford, Conn., has cut its purchasing costs by setting up a vender certification program. How it works: The company checks out the vender's quality control procedures, certifies him if he meets Norma-Hoffmann standards. That means incoming material inspections can be eliminated since the vender has already spent time and money to make sure the product meets the specifications, says the company.

Buy as near home as possible. All other factors being equal, Twin Coach says it either buys from local markets or within a 500 mile radius. Reasons: Reduced transportation and telephone costs, quicker delivery service.

• **Material Management** — If you haven't already investigated the material management concept, it might be worth a look. "It includes purchasing, production scheduling, inventory control, interplant material handling, and some traffic, under one manager," explains Daniel C. Cady, Manufacturing Division manager, American Management Association, New York.

• **Controlling Inventory** — Close control over inventories is a complicated, cumbersome, but rewarding task.

Only you know what is the "right" inventory for your operation. It varies according to warehouse space, buying in economical lots, market conditions.

The ideal would be a constant flow of materials from the supplier to the machine.

But most firms have to be satisfied with getting as much turnover as possible.

Here are some procedures metalworking companies are employing to keep a tight rein on their inventory costs.

• Keep as much of your inventory as possible in the vender's plant. One way: Blanket orders on repetitive production items.

• Know what your inventory costs are. Many firms don't. At a recent American Management Association conference, 45 per cent of the conferees reported they didn't know how much it cost them to maintain their inventories. A pretty good median figure for the yearly cost of maintaining an inventory: Figure on 15 to 25 per cent of the value of the inventory.

• Buy when you think prices are going to rise. Work off inventory if you think prices are on their way down.

• Closely control the few items that make up the large portion of your inventory.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

How American Brake Shoe Co. Saves on Scrap

Saved: $41,700 per year

Buyer William Duemmel initiated purchase of a specially prepared bundle of selected No. 2 steel grades (chopped and pressed auto body steel) as a substitute for the No. 1 dealer bundle which had been regularly used in the manufacture of cast steel railroad wheels. His reasoning: Advantages of the No. 1 bundle don't compensate for the fact that the special No. 2 bundle sells for $7 a net ton less and is easier to handle. Operating personnel also found that with the new mix the percentage of bundles in each charge could be increased:

	Old charge	New charge
Wheels	22%	17%
Bundles	15%	25%
Plates & Structurals	48%	43%
Crushed turnings	15%	15%

The additional use of bundles has apparently increased melt loss 1 to 2 per cent. Even so, the new material reduces the cost of melting stock at least $41,700 per year.

Saved: $23,500 a year

Until last year, local buyers were responsible for the sale of scrap at their own operations, explains Thomas W. Russell Jr., vice president. But during the last 18 months the general purchasing department has taken over scrap sales at all locations (under the direction of one man whose sole job is scrap). Reason: "Since scrap is a trading business, it was believed that the market knowledge of the general purchasing department could be advantageously applied to sales as well as purchases," says Mr. Russell. Here are the results (determined by comparing previous local sales and subsequent centralized sales with appropriate, published scrap quotations).

	SAVED
Powdered metal scrap	$8,000 per year
Electric furnace skimmings (nonferrous)	$6,700 per year
Rail planer chips	$2,600 per year
Forge, flashings and crops	$6,200 per year
Total	**$23,500 a year**

Added benefit: The consolidation of sales has also brought an over-all reduction in sales effort.

How Federal Pacific Saved On Circuit Breaker Case

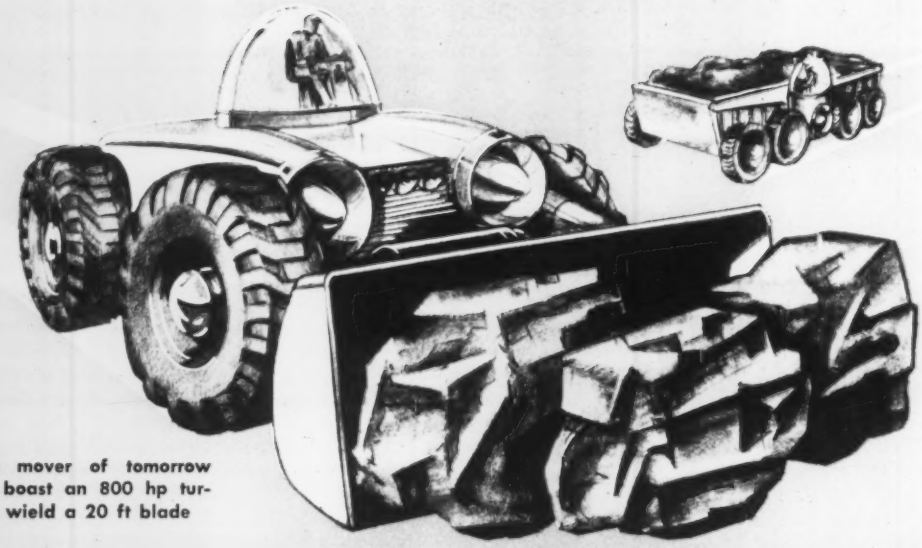
Federal Pacific's residential circuit breakers (ranging from 15 to 100 amperes) are fabricated from urea formaldehyde, a synthetic resin. There's only one hitch: Black is standard. To get the black material, Federal had to pay 35 cents a pound, a price too high in terms of the company's marketing objectives.

Robert B. Goody, special projects engineer, discovered an offcolor grade that sold for less than half that much. It had exactly the same flow, electrical, and mechanical characteristics.

Mr. Goody found that by purchasing the color contaminated material and having it dyed black, Federal could fill its requirements for 17 cents a pound. Since the company uses 125,000 to 150,000 lb of urea formaldehyde a month, its monthly savings range from $22,500 to $27,000.

Says Chief Engineer Miele: "We think of engineering research as vice president in charge of the future" . . .

1975 . . Is Now At International Harvester



Earth mover of tomorrow may boast an 800 hp turbine, wield a 20 ft blade

"We want to be right up front in uncovering new techniques and products and stimulating IH to develop them . . .

"We have to make certain that IH maintains a sound competitive advantage 10 to 20 years from now"

THE FORERUNNER of the tractor of tomorrow is being tested by International Harvester Co. on flat farmland near Melrose Park, Ill. Although it looks conventional, it's powered by a 330 lb gas turbine which isn't slated for production until 1975.

The company's concentration on turbines stems from its desire to keep ahead in new products.

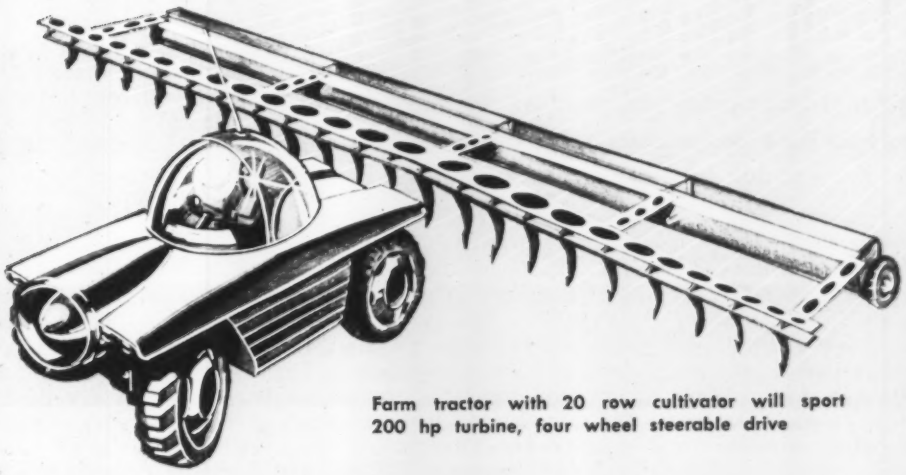
"Our main function is to make certain that IH will have a sound competitive advantage 10 to 20 years from now," says Chief Engineer Carl H. Miele. His current emphasis is on developing the aircraft turbine and the free piston engines into practical realities. They hold immense promise for steady runs which require a maximum of power (torque) at slow speeds—ideal for farm equipment, earth moving machinery, and long distance trucks.

Other advantages: Such powerplants are light and compact. The turbine replaces a 4000 lb diesel.

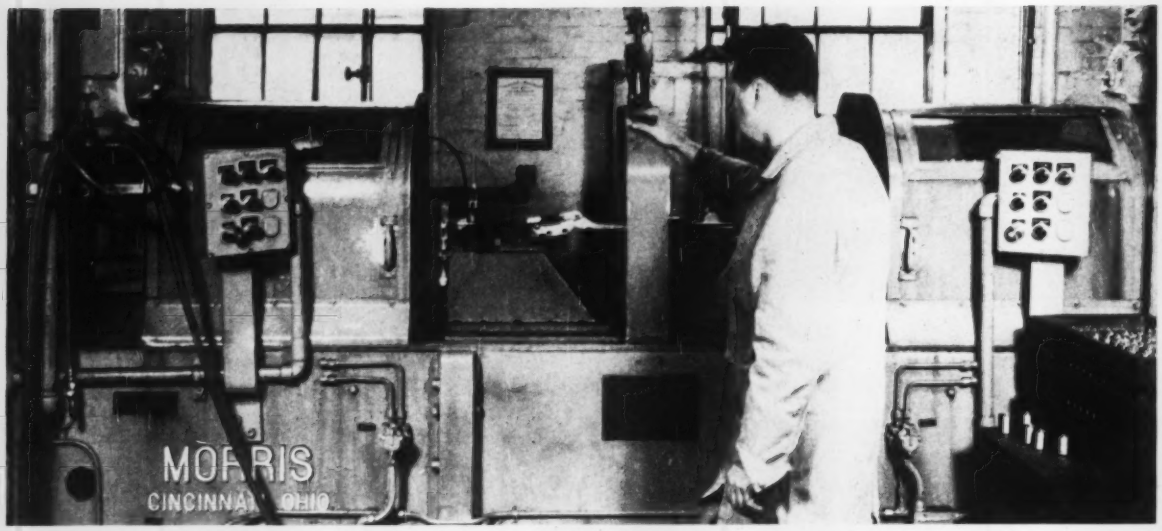
• Mr. Miele doesn't think the move will be accompanied by a radical change in metalworking markets.

Here is his thinking: "Castings could conceivably play a large part in the construction of both engines and vehicles. Some form of gear reduction must be used, so that means cast gear cases. In addition, compressor scrolls, the final drive housing, and main frame of the engine are all candidates."

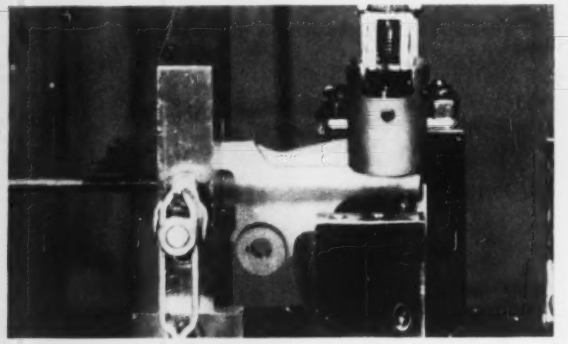
Other effects: A slight shift to high temperature alloys and stainless.



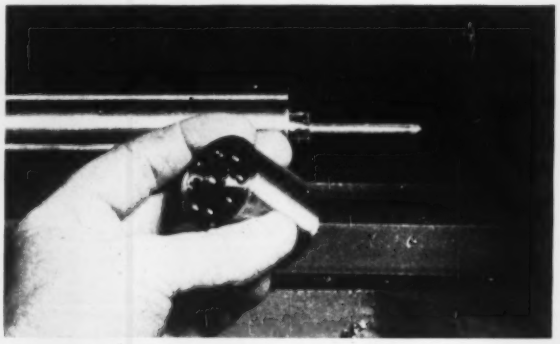
Farm tractor with 20 row cultivator will sport 200 hp turbine, four wheel steerable drive



Left end of the machine turns out revolver barrels, right end drills the eight-chamber cylinders. Output: 30 barrels and 30 cylinders an hour



Locked in place, this 2¾ in. long barrel will be completely drilled in less than 2 minutes



The operator holds a completed eight-chamber cylinder. Each hole is held to ±0.0002 in.

Gun Drill Clips Hole Costs

Two parts for a mass produced revolver are turned out simultaneously on the same machine. The method has boosted precision in the weapon as well as saving dollars

WORKING on two different parts at the same time, a double-ended gun drilling machine has cut 11 per cent off time and labor costs in production of revolver barrels and eight-chamber cylinders at Iver Johnson's Arms & Cycle Works Inc., Fitchburg, Mass. The new machine replaced six old ones.

• **Setup**—Holding tolerances within ±0.0002 in., the gun drilling operation eliminated a reaming operation on each part.

Built by Morris Machine Tool Co., Cincinnati, the machine consists of two drill units mounted horizontally on separate bases. The bases are tied together with a 36 in. long cast iron fixture base. The left hand section of the machine drills the barrels; the right section machines the cylinders.

A spindle speed of 8000 rpm and a feed rate of 0.0005 in. per revolution is used for drilling both SAE 4130 steel parts. Production rate for both is 30 parts an hour, varying some with the depth of the holes.

An adjustable load control on each drill unit automatically detects dull or chipped drills, hard spots in the material, or an inadequate supply of coolant.

The control instantly reverses the quill, saving the tool and reducing loads on the drill units.

• **Sequence**—The eight holes in the cylinder are 1⅜ in. deep with a diameter of 0.223 (±0.0002). After the first hole is drilled, the tool retracts, the workpiece indexes into position for the second hole, and the cycle repeats automatically.

The hole in the barrel has a diameter of 0.207 (±0.0002 in.) with concentricity to the outside diameter held to 0.0015 in. Cycle time now is only 2 minutes for each 6 in. barrel.

Hold that pipe line!

To hold this pipe securely in place—to tie it down so it is safe to haul—takes experience, a little engineering, and some powerful holding. Flat, tensional steel strapping does it...does it better and at less cost than anything else. This is one reason why the use of steel strapping continues to increase. Other reasons are that Signode offers the right kind of strapping and knows the right method for every type of shipment...there are hand tools, power tools and automatic machines to apply it, and test facilities at Signode to find out in advance how your product will behave in transit. For more information, call the Signode man near you, or write:

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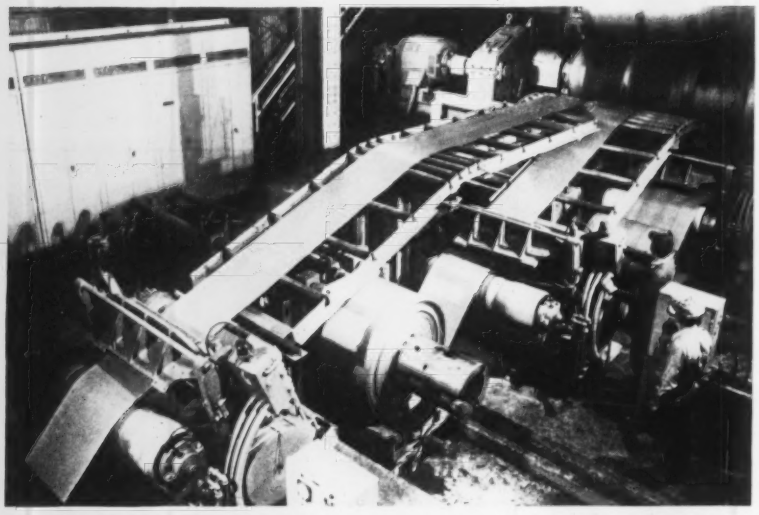
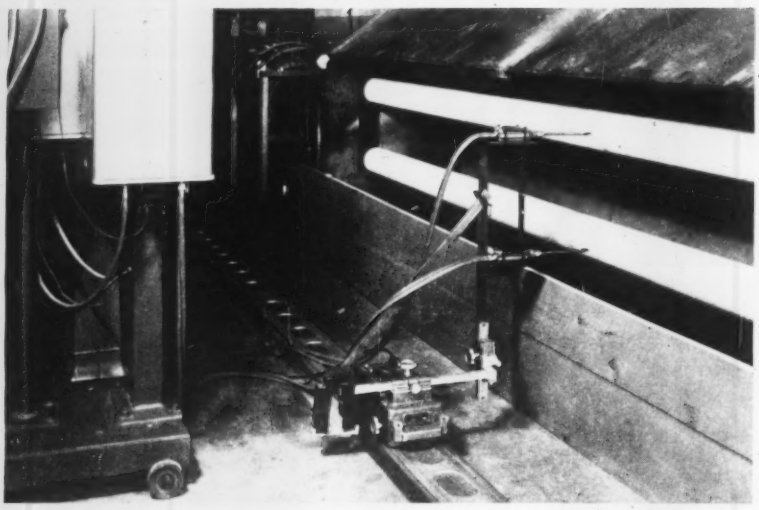


Silicon steel strip coming out of this normalizing furnace is free of dents because deposits of chromium and silicon don't build up on the rolls

Ceramic Coated Furnace Rolls Insure Better Silicon Strip



Powder from feeders (left) is blown through an oxygen line to an oxyhydrogen torch, sintered in the flame, and applied to rotating furnace rolls

MAKERS of silicon steel coils expect flame ceramics, a new refractory coating process, to reduce steel spoilage and roll maintenance costs.

The process is used to put a refractory coating on rolls for a normalizing furnace used at the Brackenridge (Pa.) Works, Allegheny Ludlum Steel Corp.

The technique was developed at Armour Research Foundation, Illinois Institute of Technology, Chicago, and licensed to Continental Coatings Corp., Cleveland. Rolls were coated by Sylvester & Co., Cleveland.

• **The coating is applied to the rolls with pressure powder feeders and lightweight, oxyhydrogen torches.**

Use of powder, instead of solid rods, permits larger areas of coating material to come into contact with the torch flame. That makes for faster coating. Lightweight torches, receiving powder from the feeder through the oxygen line, can be used in any position, for manual or mechanized coating.

Furnace rolls lend themselves to mechanical processing. Torches travel the length of rotating rolls, applying a strong and uniform coating.

• **Exact cause of buildup on furnace rolls isn't known. But customers won't accept silicon steel strip with dimpled, or dished surfaces.**

Roll buildup and dents in finished sheets are universal problems in silicon steelmaking when horizontal normalizing furnaces are used. Buildup consists of small silicon or chromium deposits that leave impressions on thin strip (22 to 29 gage) at high processing temperatures.

Defects are noticeable as the steel comes out of the furnace. Some customers reject the strip because of its appearance; others require a high degree of flatness for special applications.

The material is used in magnets, rotors, stators, armatures, and transformers; steel cores are built up from a large number of laminations.

Core loss, or the loss of magnetic transmission through a core, is the standard measurement of electrical steel quality. A given stack height of core laminations made from severely dimpled stock may show enough core loss to impair performance of electrical equipment. In a test for dimpled material, laminations are stacked to a given height and compared with the equivalent in solid steel. The ratio of stacked laminations to an equivalent weight of solid steel (stacking factor, or lamination factor) must be at least 95 per cent.

• **Coated rolls were so satisfactory**

GENERALLY AVAILABLE ROUND SIZES* (B.W.G.)

Size of Tubes	CARBON		STAINLESS
	Cold Rolled	Hot Rolled	
⅛			20-25
¼			16-25
⅜	14-22		16-25
½	14-22		14-25
⅝	13-22		14-25
¾	13-22	13-16	12-25
⅞	13-22	13-16	12-25
1	11-22	11-16	11-25
1⅛	11-22	11-16	11-25
1¼	11-22	11-16	11-25
1⅜	11-22	11-16	10-23
1½	11-20	10-16	10-23
1⅝	11-20	8-16	10-23
1¾	11-20	8-16	10-23
1⅞	11-20	7-16	10-23
2	11-20	6-16	9-23
2⅛	11-20	6-16	9-22
2¼	11-20	5-16	9-22
2⅜	11-18	5-16	8-22
2½	11-18	4-16	8-22
2⅝	11-18	4-16	8-21
2¾	11-18	4-16	8-21
2⅞	11-18	4-16	8-20
3	11-18	4-16	8-20
3⅛	11-18	3-16	8-20
3¼	11-18	3-16	8-20
3⅜	11-18	3-16	8-20
3½	11-18	3-16	8-20
3⅝	11-18	3-16	8-20
3¾	11-18	3-16	8-20
3⅞	11-18	3-16	8-20
4	11-18	3-16	8-20
4⅛	11-16	3-16	8-18
4¼	11-16	3-16	8-16
4⅜	11-16	3-16	8-16
4½	11-16	3-16	8-20
4⅝	11-16	3-16	8-18
4¾	11-16	3-16	8-18
4⅞	11-16	3-16	8-18
5	11-16	3-16	8-18
5½	11-16	3-16	—
6	11-16	3-16	9-20

*Intermediate sizes, also larger and smaller sizes and heavier walls are available. Square, rectangular and other tubing shapes are also available in peripheries from 1" to 20" inc.

CARBON GRADES

Grade Designation	Carbon %	Manganese %	Phosphorus % Max.	Sulphur % Max.
MT 1010	0.05/0.15	0.30/0.60	0.040	0.050
MT 1015	0.10/0.20	0.30/0.60	0.040	0.050
MT X1015	0.10/0.20	0.60/0.90	0.040	0.050
MT 1020	0.15/0.25	0.30/0.60	0.040	0.050
MT X1020	0.15/0.25	0.70/1.00	0.040	0.050

HIGHER CARBON AND ALLOYS

Grade Designation	Carbon %	Manganese %	Phosphorus % Max.	Sulphur % Max.
C 1025	0.21/0.28	0.30/0.60	0.040	0.050
C 1026	0.21/0.28	0.60/0.90	0.040	0.050
C 1030	0.27/0.35	0.60/0.90	0.040	0.050
C 1035	0.31/0.39	0.60/0.90	0.040	0.050

STAINLESS STEEL PIPE SIZES

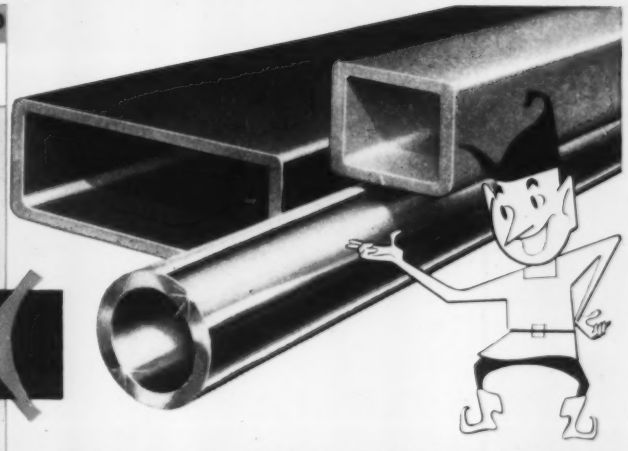
Stainless Steel Pipe Sizes are available from ⅛" I.P.S. through 2" I.P.S. in A.S.A. schedule 40S; from ⅛" I.P.S. through 4" I.P.S. in schedule 10S; and from ½" I.P.S. through 4" I.P.S. in schedule 5S wall thicknesses. Inquiries for larger diameters should be referred to a quality stainless steel pipe producer listed below.

STAINLESS GRADES

Type No.	Carbon (*)	Chromium	Nickel	Other Elements
302	.15	17-19	8-10	....
304	.08	18-20	8-12	....
304L	.03	18-20	8-12	....
309	.20	22-24	12-15	....
309S	.08	22-24	12-15	....
309SCB	.08	22-24	12-15	cb10XC Minimum—1 Maximum
310	.25	24-26	19-22	....
310S	.08	24-26	19-22	....
316	.08	16-18	10-14	Mo. 2-3
316L	.03	16-18	10-14	Mo. 2-3
317	.08	18-20	11-15	Mo. 3-4
321	.08	17-19	9-12	Ti 5 X C Minimum
329	.20	23-28	2½-5	Mo. 1-2
330	.15	14-16	33-36	....
347	.08	17-19	9-13	Cb-Ta 10 X C Minimum
348	.08	17-19	9-13	CB-Ta 10 X C Minimum Ta .10 Maximum
430	.12	14-18	....	....
442	.20	18-23	....	....
443	.20	18-23	....	Cu .9-1.25

(*) Maximum—unless otherwise indicated.

LC-592



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- THE SIZE
- THE GRADE
- THE SHAPE

For a versatile tubular product, nothing equals Welded Steel Tubing. The quality producers offer a broad range of sizes and wall thicknesses in all weldable grades of carbon, stainless steel and other alloys. It is particularly adapted to shapes ranging from round, square and rectangular to the most complex special cross sections.

Welded Steel Tubing—as manufactured by the quality tube producers—offers a concise answer to most design problems. Specify Welded Tubing on your next order.

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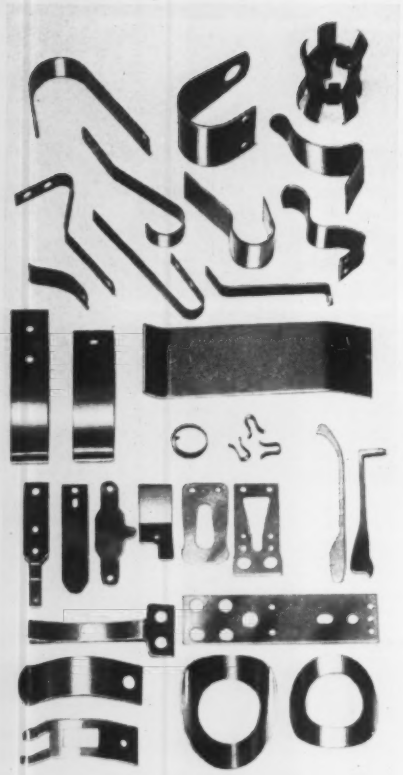

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Where performance is important, Sandvik spring steel quality is well worth its price. Many spring steel users have found that Sandvik delivers the *exact* performance they want under their tools and in their products.

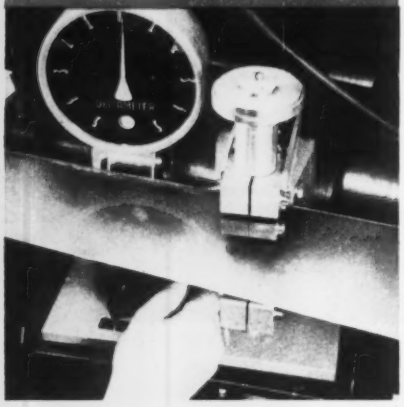
Sandvik's purity, small lot processing and painstaking quality control assures your money's worth in consistent quality performance.

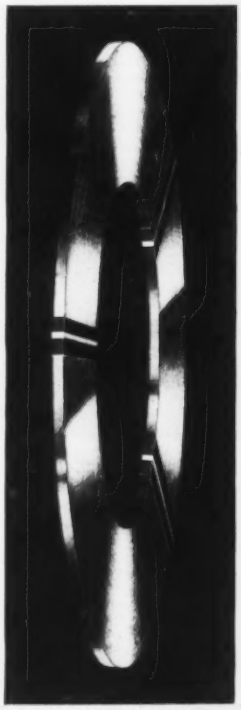
In addition to the wide variety of qualities and sizes carried in stock, Sandvik has local facilities for custom-processing and finishing to your requirements.

For specific physical properties plus accurate flatness, straightness, width, gauge and edge finish, specify a Sandvik spring steel.

Send for free brochure on various Sandvik cold rolled and hardened and tempered strip steels.

Strip thickness is checked during rolling and at final inspection with a "Deltameter", an instrument developed at Sandviken for measuring variations of thousandths of a millimetre.





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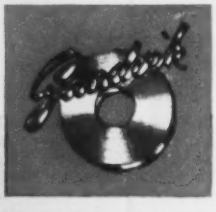

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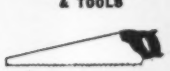


SS-200

in one furnace at the Brackenridge plant that they will be used in another, larger unit.

The company uses flame ceramic coated rolls to carry strip through a 216 ft normalizing furnace. Formerly, buildup developed on the rolls and caused dents in the strip.

The company installed two ceramic coated rolls in the furnace and removed them after a few weeks of use. They had developed only a slight buildup; that could be removed easily with a knife point.

Later, 40 more rolls were coated and installed in the furnace. A number of the coated rolls were removed and examined over a six month period. Results were the same as with the first two. It was then decided to coat the rolls in the company's 340 ft furnace, says William C. Benzer, superintendent, Finishing Dept.

• The process is being extended to other high temperature applications.

The combustion chamber of the ramjet engine for the U. S. Navy's Talos (a ship-to-air missile) is being coated by the flame ceramic process. In the hottest parts of the chamber, temperatures have been reduced as much as 400° F.

The coating is also useful in railway diesel engines. In tests run by Chicago & Eastern Illinois Railroad, coated piston crowns kept piston skirts, rings, and liners clean, and prevented clogging deposits from forming in the engines.

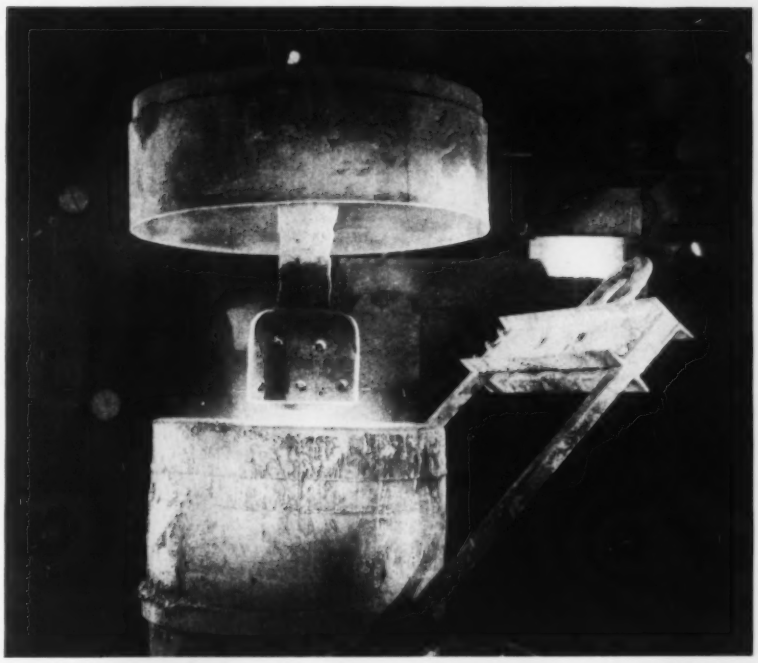
Oil filters were changed only every 20,000 miles, instead of 8000.

Part for Brazing Revamped, Costs Drop 80 Per Cent

Redesigning a stainless turbine rotor for furnace brazing resulted in lower processing, labor, and material costs, says Wall Colmonoy Corp., Detroit. The savings added up to 80 per cent.

The part is now formed by brazing together a premachined stainless ring and disc. The ring has airfoil shaped slots to accept the blade root forgings. The forged blades (38 pieces) are finish machined to specifications prior to brazing.

A machined ring fixture is used to support the blades during furnace processing.



Bell containing high magnesium alloy enters ladle of molten iron. Heavy ladle cover stops the bell at the most effective plunging depth

Alloy and Technique Control Structure of Ductile Iron

PRODUCERS of ductile iron are getting higher and more uniform magnesium recoveries by treating base iron with a new, richer magnesium alloy and using better addition techniques.

The new alloy contains twice as much magnesium as those generally used. Developed in Germany, it is available from Union Carbide Metals Co., New York, a division of Union Carbide Corp.

• Magnesium additions are more efficient with the new method; better ductility is obtained.

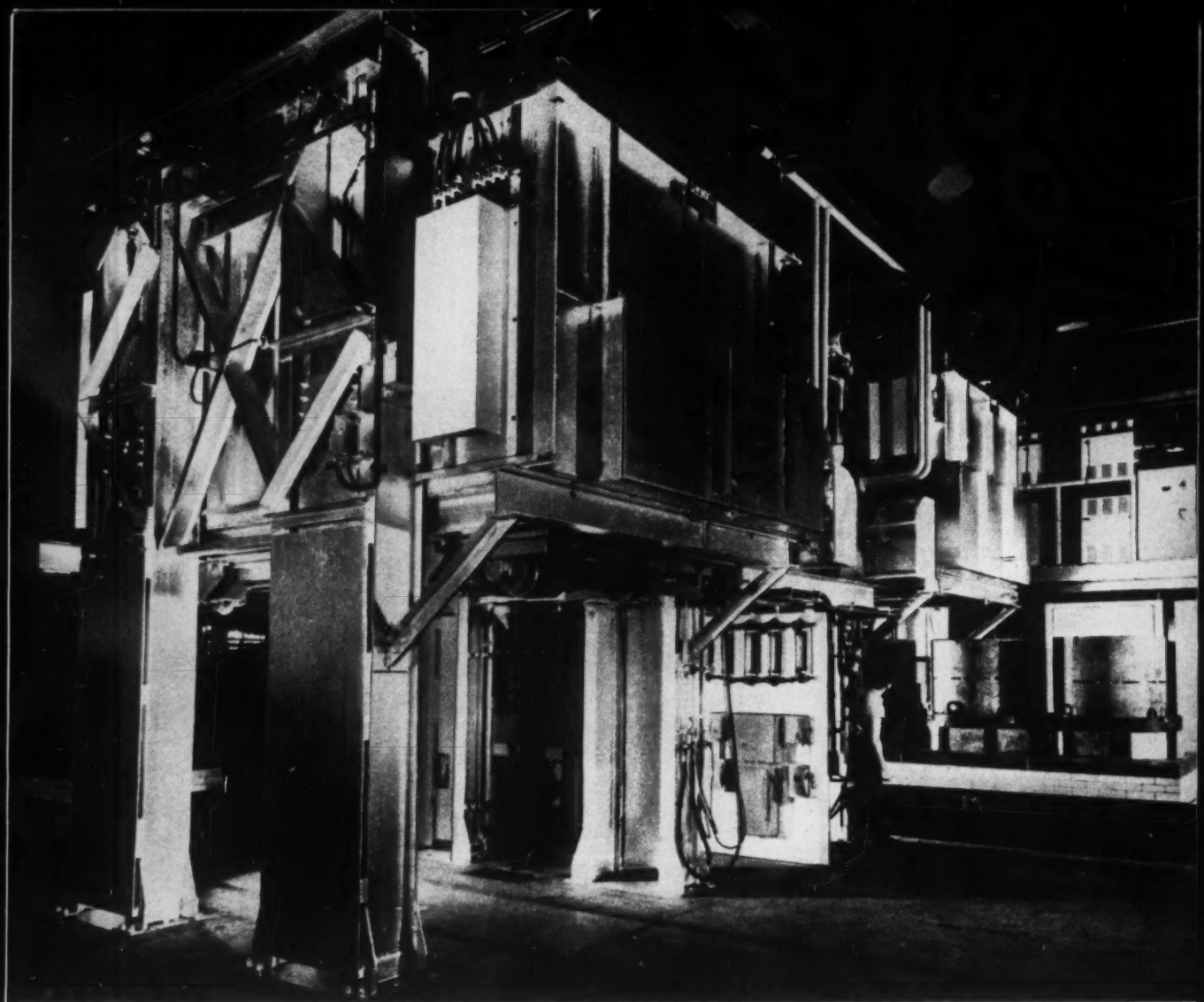
Addition is made by plunging the alloy into the molten iron. High magnesium content (30 to 32 per cent) often permits a smaller plunger to be used. That minimizes temperature losses and equipment cost. Calcium in the alloy (4 to 5 per cent) reduces fireworks produced by magnesium treatment.

High magnesium-to-silicon content makes the alloy helpful in treating acid cupola iron. Enough magnesium can be added to remove sulfur and produce a ductile iron structure without exceeding silicon specifications. Since the alloy has a silicon base, it helps produce ferritic iron, with high as-cast ductility.

• Close structure control is possible without elaborate equipment.

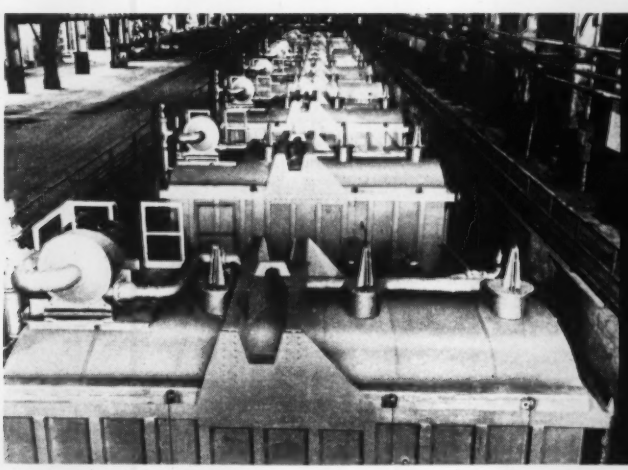
The alloy, in a light gage steel can, is fastened in a refractory bell and plunged deep into the iron. The bell resembles an inverted crucible, attached to a refractory covered vertical shaft. Holes in the sides of the bell permit magnesium vapor to escape and bubble up through the molten iron. Part of the vapor is absorbed by the iron.

Generally, a crane or hoist is used to lower the plunger into the ladle. A heavy iron or steel ladle cover controls immersion depth.



Electrically-heated elevator furnaces for atmosphere annealing at temperatures in the range of 2000° Fahrenheit.

SWINDELL-DRESSLER



Large electrically-heated portable furnaces for annealing electrical steels in recirculating protective atmospheres at high temperatures.

ENGINEERING SERVICE Swindell-Dressler Corporation provides a complete engineering service for the steel industry in the design and construction of new plants, and modernization of existing facilities. Consultations arranged gladly on request.

When your requirements are for

HIGH-VOLUME HIGH-TEMPERATURE Annealing

Let SWINDELL-DRESSLER serve!

The elevated-temperature annealing of cut products and small coils is a Swindell-Dressler specialty. Employing advanced design and construction features for high production rates, our range of furnace types and capacities covers every high temperature annealing requirement—including those for special steels, and titanium. Let us go into the details with you, at your convenience.

FURNACES for sheet and strip annealing

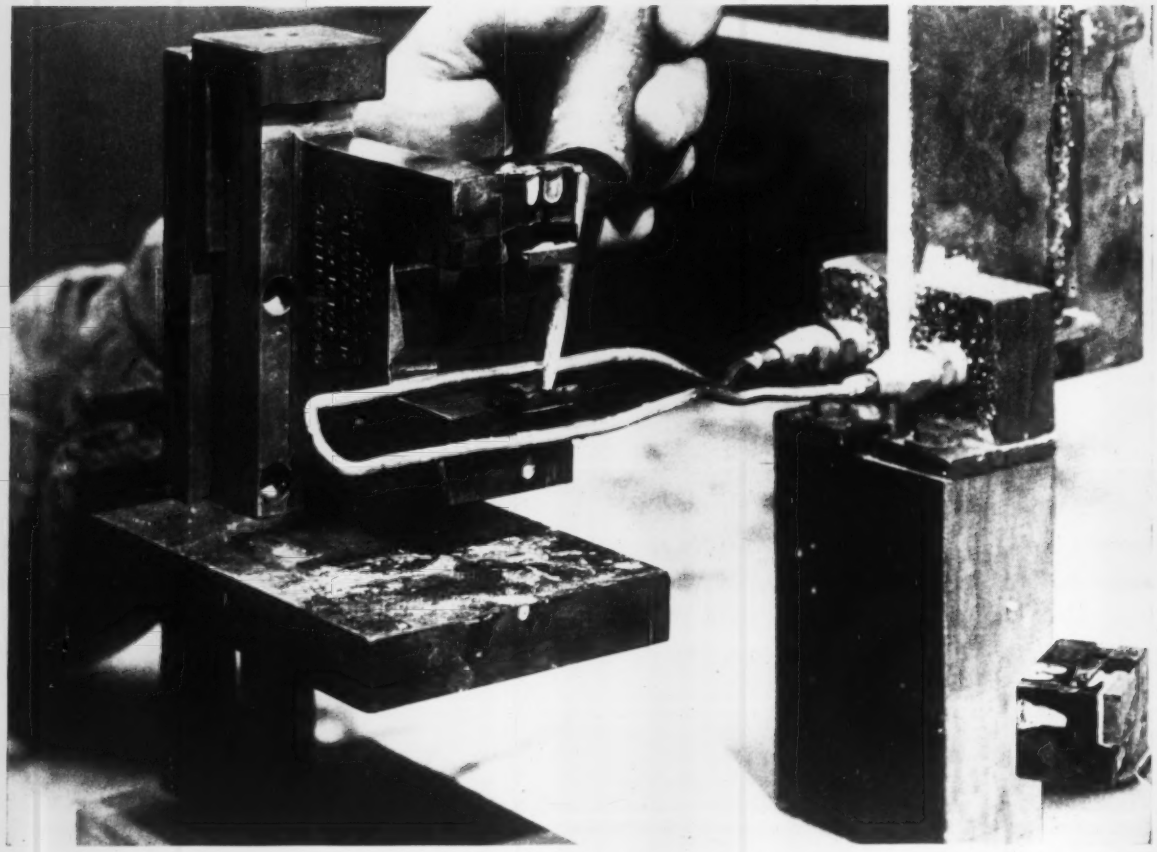
Bright annealing muffle-type furnace for stainless tubes. Product is drawn through muffle containing protective atmosphere of hydrogen.

SWINDELL-DRESSLER CORPORATION

DESIGNERS AND BUILDERS
OF MODERN INDUSTRIAL FURNACES

PITTSBURGH 30, PA.

Tools, Gages Brazed by Induction Method



Perfex gage in position for silver soldering, showing simple copper heating coil. Upper jet strip has been brazed; lower one is being positioned with soldering tool

Simpler control makes accuracy easier, reduces rejects, nets production savings. Scale is not a problem, and localized heating avoids warpage at the temperature required

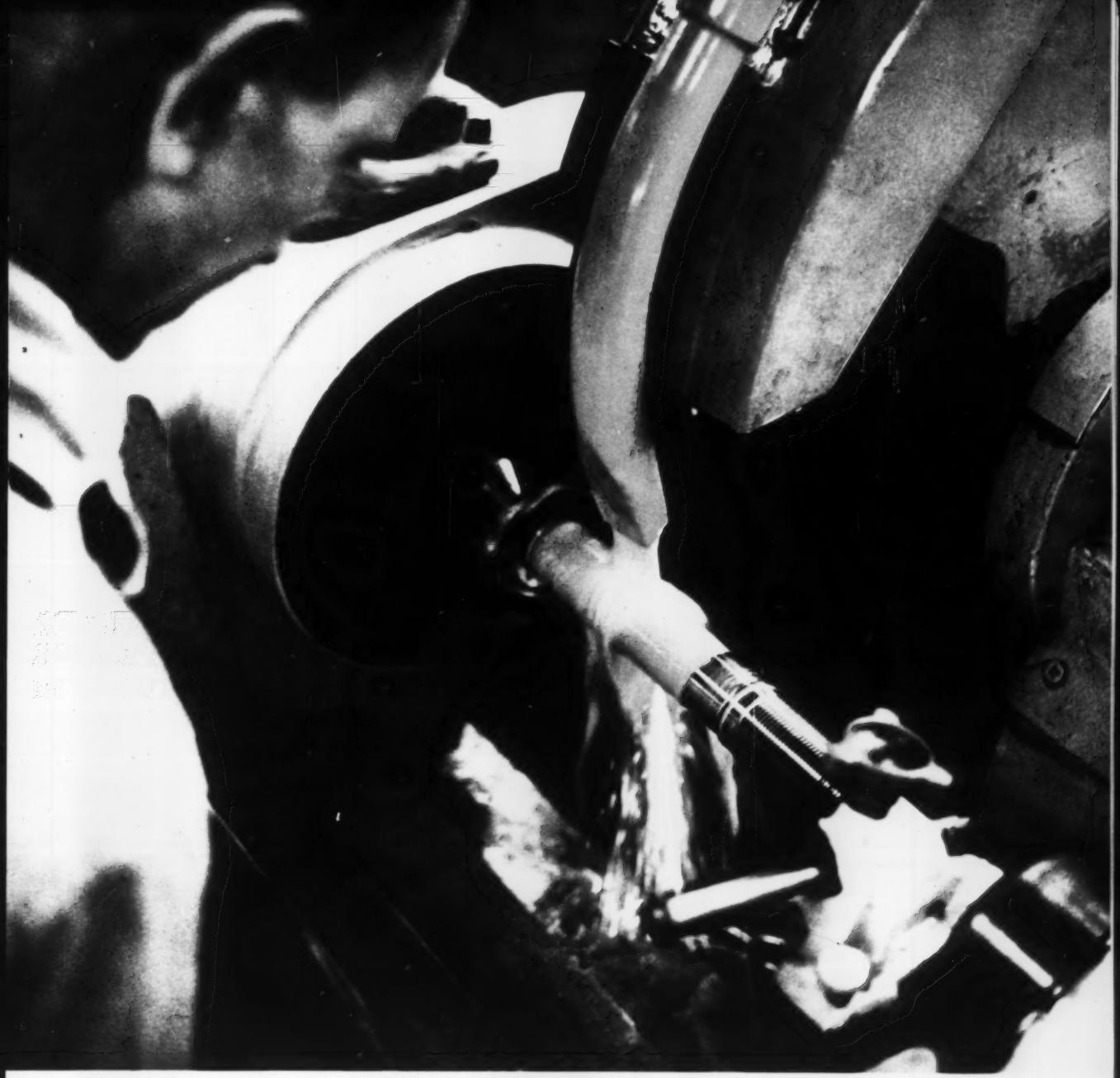
PUSHBUTTON BRAZING is saving production dollars for manufacturers of tools and gages, as well as improving the quality of their work. They also report savings in time and floor space, plus the reduction of operating hazards.

High frequency power is supplied to simple fixtures which induce the heat only in the area required. The rest of the workpiece remains cool, so that holding the work is easy; the equipment can be placed in the production line to eliminate excessive handling; because heating time is short, scale is not a problem, and the localized heating avoids warpage at the temperatures required.

• **Precision Gages:** Perfex Gage & Tool Co., Mt. Clemens, Mich., uses a 15 kw high frequency induction heater, made by General Electric Co., Shelbyville, Ind. for fastening carbide jet tips in position for internal and external precision gages. The bond must be mechanically sound and should be airtight for proper sensitivity of the completed unit. The orifice or jet for the air, used to determine the distance from the work being tested, is small, and cleaning of the silver solder was a problem whenever solder distribution was not uniform.

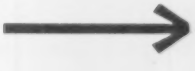
Ernest G. Schuster, plant manager, reports that use of the induction heating unit has saved 66 per cent on brazing costs. The body of the gage is SAE 8620 steel, and the jet strips are wear resistant carbide for long life. Heating of the bond area, rather than the entire body and jet, makes it possible to ignore differential expansion between the

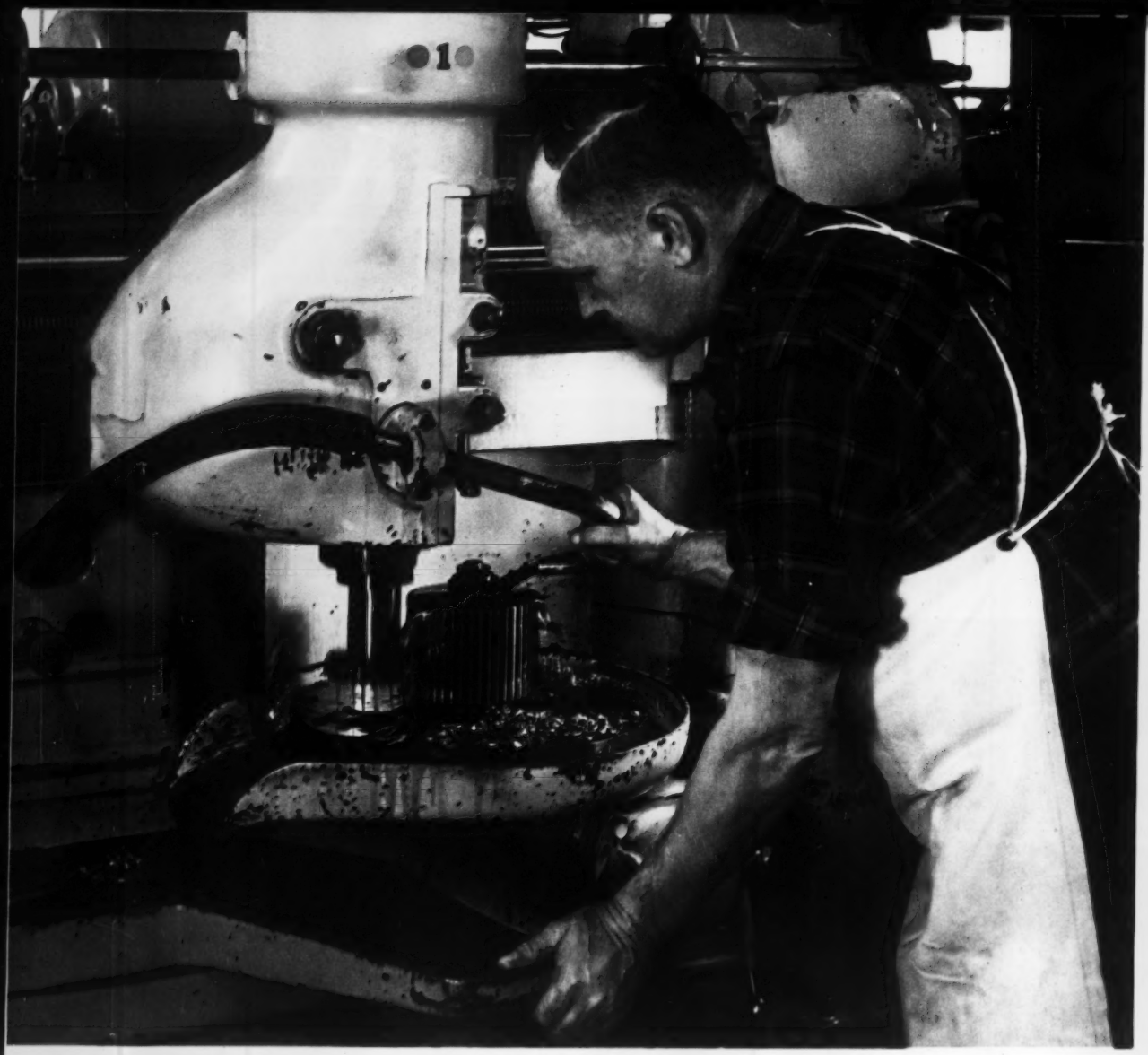
(*Please turn to Page* 145)



Grinding connecting rod bolts to a 4 micro-inch finish, this cylindrical grinder is using Gulfcut Heavy Duty Soluble Oil, in emulsion concentration of 32:1. Workpiece is of 4140 steel. Speed: 225 sfm. Dept of cut: .020" with 30" x 1" aluminum oxide wheel.

Here are latest machining reports of Gulfcut performance . . . see how GULF MAKES THINGS RUN BETTER!





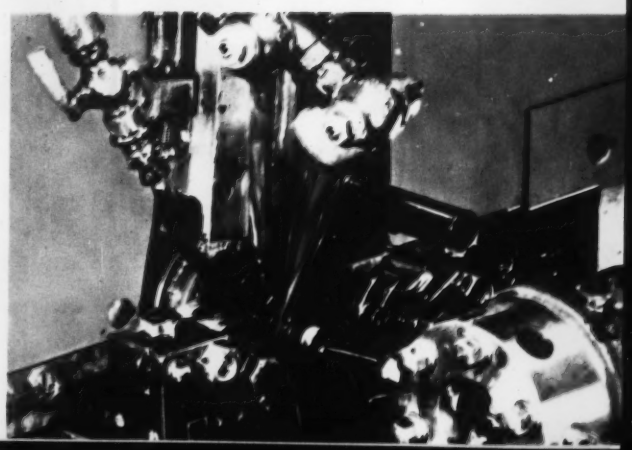
The relatively light color and transparency of Gulfcut 21C permit close inspection of the work in progress on this gear shaper. Gear being cut is of 4815 steel.

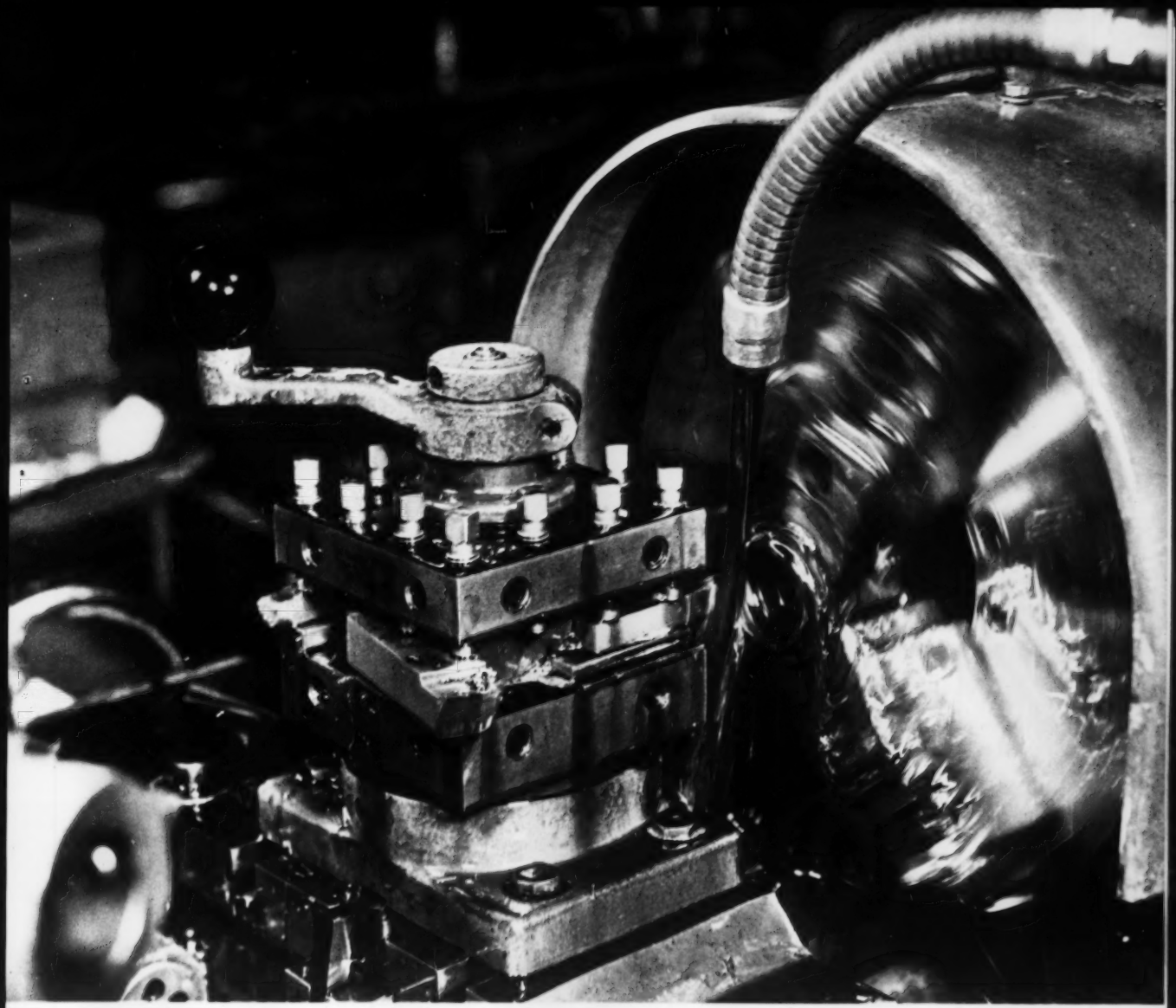
Gulfcut users report better results over a wide range of machining operations

There's impressive evidence of better results with Gulfcut oils in reports from hundreds of satisfied users. Results like these, that add up to lower machining costs: longer tool life, heavier cuts at higher speeds, finer finishes, closer tolerances, extended oil life.

You name the job . . . there's a Gulfcut oil to help you do it more efficiently at less cost. Choose from 10 types of shop-tested oils in 17 different Gulfcut grades. The Gulfcut line includes mineral-lard oils . . . sulfurized-mineral oils . . . sulfurized-mineral-lard oils . . sulfo-chlorinated-lard oils . . . two types of emulsifying oils.

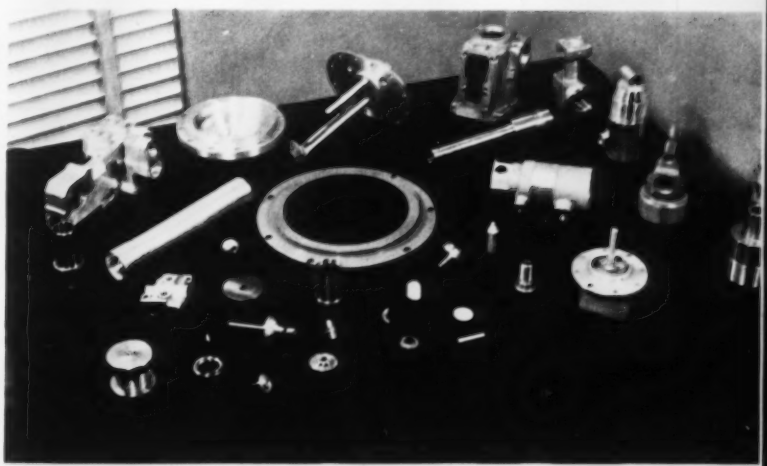
Let us have an opportunity to demonstrate what these products can do. You'll see plenty of proof that Gulf makes things run better.





"We like the tough machining jobs—and do them with Gulfcut," says M&O Tool and Manufacturing Company, Wallingford, Connecticut. Here they're using Gulfcut 11D in a turret lathe to machine aluminum aircraft parts to a fine microfinish without additional lapping or grinding. Gulfcut oils help this company hold tolerances of .0005" on aluminum, titanium, monel, inconel, and many grades of stainless steel.

Some of the intricate and difficult parts machined at M&O Tool and Manufacturing Company for the aircraft and electronic fields, with the aid of Gulfcut 11D, 31C and 45B.



"Excellent finishes and outstanding tool life with Gulfcut 31C." That's the report from Bar-Work Manufacturing Company, Waterbury, Connecticut. A jobbing screw machine shop, Bar-Work is proud of its reputation for turning out precision work. Gulfcut 31C is used here in all steel machining operations.

Non-ferrous metals don't stain when you use Gulfcut 11A, shown here at work in a universal turret lathe. Gulfcut 11A is a non-corrosive, non-staining, mineral-lard oil recommended for machining non-ferrous metals.

NEW 100-PAGE MANUAL gives full information on selection and usage of cutting oils. Mail coupon for your free copy of "Metal Machining with Cutting Fluids." Also let us send you product bulletins on Gulfcut oils.

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GULF

GULF MAKES THINGS RUN BETTER!

different components.

The jet strip is first cleaned in carbon tetrachloride to remove grease and oil, coated with the proper flux for the silver-copper brazing alloy, then assembled with the alloy in position. With the assembly placed in the coil of the induction heater, power is applied until the solder comes to the melting point; the operator can then position the jet strip with a simple tool as it "floats" on the molten silver solder. When the power is turned off, the alloy solidifies and the completed gage is washed with hot water to remove flux residue. Following the removal of any excess solder, the work is checked for compliance with specifications.

• **Old Way**—The previous method required preheating of the entire body of the gage. Next, the shim area was heated separately to bring the alloy to the melting point. Unequal heating was commonplace, causing air leakage between the chambers of the gage; leaks are said to be eliminated with the new method.

Nonuniform heating was also responsible for carbide breakage, which is no longer a problem.

An additional advantage, much appreciated by the operators, is the ease of handling. With most of the work being cool, it is no longer necessary to use asbestos gloves while positioning the jet strip in relation to air apertures in the gage body to the allowed tolerance of 0.015 in.

Also eliminated is the frequent reworking of brazed gages due to poor tolerances, air leakage, and occasional breakage from excessive heat. Mr. Schuster says the new equipment has virtually eliminated such waste and has removed the danger of loss of the silver solder due to too much heat.

• **Carbide Tools**—The combination of carbide inserts with steel bodies is common in the manufacture of carbide cutting tools. Lake Tool Co., a division of Metro Tool & Gage Co., Crystal Lake, Ill., has added a General Electric induction heater for this silver soldering job after using a muffle furnace with hydrogen as an atmosphere; while both are still in use, the bulk of the production is being handled by induction. L. Goosens, plant manager, gives a number of reasons for the change. Jobs are easier to handle, he says, and a high volume of production is possible with the induction unit, while diamond wheel grinding costs are cut by at least 20 per cent on tools ¾ in. square and larger.

Operator at Lake Tool Co. brazing carbide tip on cutter. Multiturn coil of copper tubing and simple positioning aid production

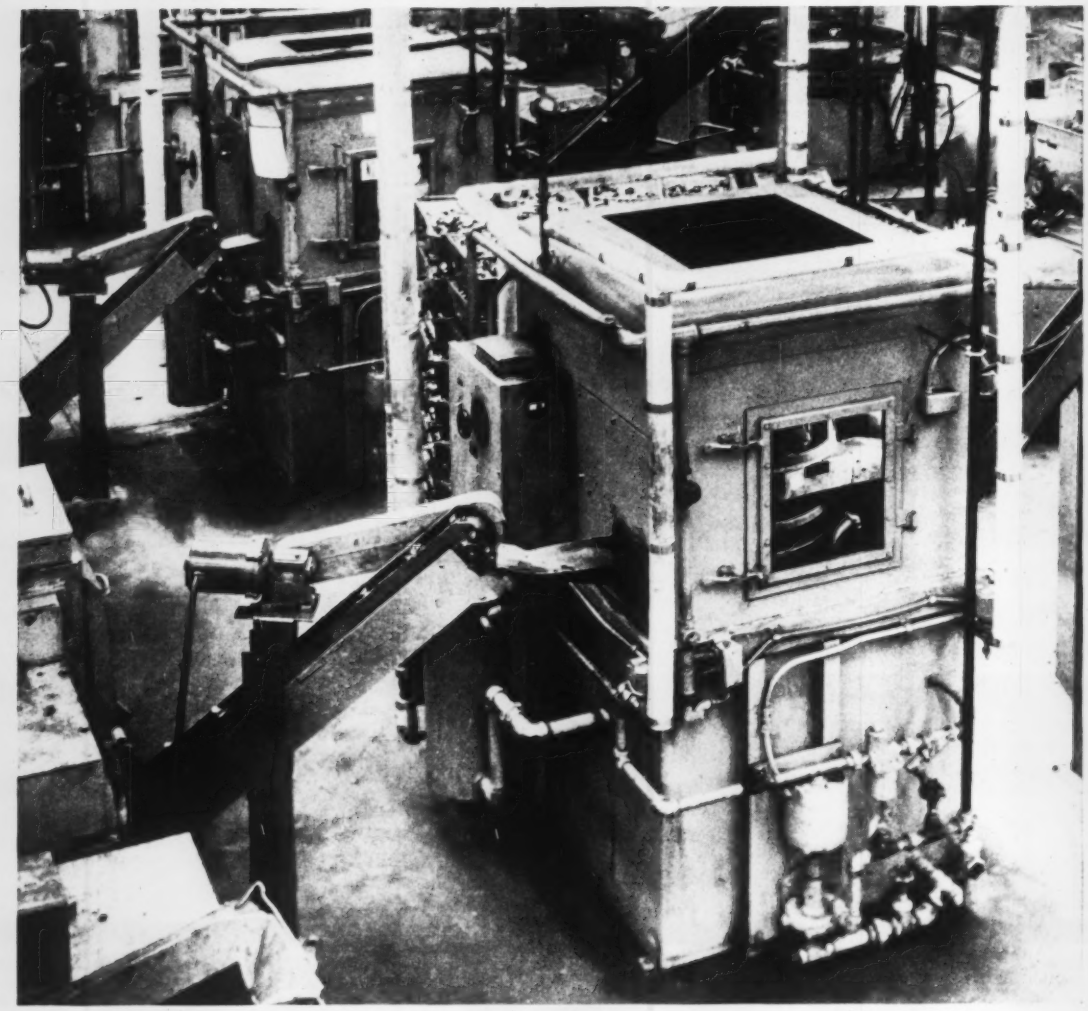
In comparing the new unit with the previous furnace, he reports that production time per job is reduced, which is of great importance when considering the wide variety of special tools which must be produced. Cleaner and better quality joints are produced, due to the short cycle and the fact that the operator can position the parts during the heating cycle—uncontrolled movement or "floating" of the carbide insert during the brazing operation had been a problem previously.

The induction heater, says Mr. Goosens, has a lower maintenance cost than had been the case with the hydrogen unit and can be started or stopped by simply throwing a switch. The operator places the prepared assembly in the loop type fixture with her left hand, tripping a switch to start the cycle. A tool with an insulated handle permits her to adjust the carbide insert to be sure that it is properly seated in the steel support. After cooling, the tool is washed to remove flux before diamond grinding.

• **No Atmosphere**—Another advantage of induction equipment is the elimination of special atmosphere. When the hydrogen furnace is used, explosion hazards require that the operator be trained in proper procedures for startup and shutdown as well as during the brazing cycle. No such problems are encountered with the induction unit.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Subsonic Degreaser Competes with Ultrasonics

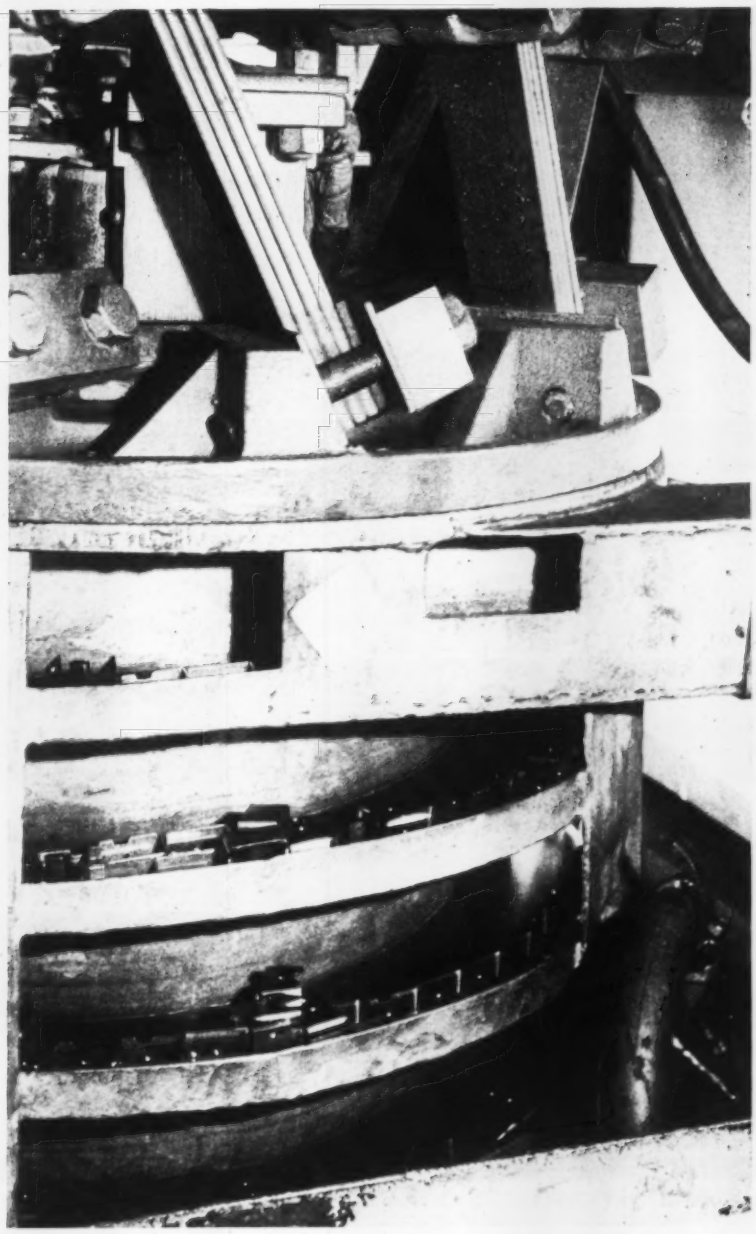


These Manpro units are installed in the production line at the Essex Junction, Vt., plant of International Business Machines Corp.

One company reports it cleans 5 million small parts in an 8 hour shift. Nail producers find they can clean 112 tons of nails with a drum of solvent

A VAPOR DEGREASER that vibrates subsonically can cut the cost of cleaning small, mass production parts in half and save up to 75 per cent of the floor space needed for conventional vapor degreasing tanks. The Vibra degreaser (developed by Manpro Corp., Detroit) is said to compete with ultrasonic equipment in many applications where automatic in-line production cleaning is needed.

• **Principle**—Instead of using a long tank for degreasing fluid and vapors, the machine moves parts up a fixed spiral conveyor track which is vibrated by leaf springs attached to an electromagnet. The track vibrates at 30 or 60 cycles per second vs. a minimum of 200,000 cycles per second for ultrasonic cleaners. Ultrasonic units vibrate only the solution. This equipment vibrates both the solvent and the



Here's how the electromagnet and leaf spring arrangement are attached to the spiral track at the top of the machines

parts, which is said to make for more efficient cleaning of many small workpieces. Since the action is supplied through an electromagnet, there are no moving parts or motors. So the equipment is almost maintenance free.

• **Proof**—Kirsh Co., Sturgis, Mich., has been using it to clean drapery hardware parts. Leo Cook, Kirsh's methods and process engineer, reports that even though a new product has doubled production requirements, the degreaser is saving about 55 per cent on solvent consumption —hand vapor degreasers were previously used.

• **Process**—Parts are loaded from above the vapor line into a tray beneath the spiral track either manually or by conveyor. The cleaning solvent (usually trichlorethylene) in the tray is heated to boiling and vapors rise about halfway up the track where they become condensed. The clean condensate is collected in a trough and piped back into the track, so it provides a counterflow cleaning action against the parts vibrating up the track. The higher the parts go, the cleaner they become and the cleaner the solvent is because it's being washed downward.

Jacketed steam drying sections on the upper part of the track flash solvent off the parts in the vapor zone, so it can be condensed back into the bottom tray for re-use. Parts come out at the top of the track and automatically are chuted into tote boxes or to other in-line operations. Chips are separated when they fall through screens in the bottom of the chutes.

• **Savings**—Since the whole unit is self-contained and uses nonflammable chlorinated solvents, it can be completely enclosed, eliminating the need for special vapor hoods and reducing loss of solvent as vapor. There are no internal parts baskets or conveyors to carry out any of the solution along with the parts. Sylvania Electric Products Inc. reports it uses a gallon of solvent to clean 5 million small parts in an 8 hour shift.

R. C. White, Manpro's president, says the unit was developed to clean titanium chips. The company is also building zirconium degreasers. Many of the special oils and lubricants can be reclaimed by hooking a simple still to the degreaser. Manpro claims the unit cannot be overloaded because of continuous, vertical movement of parts on the spiral track.

The degreasers are usually built to order in four basic sizes. Maximum dimensions are 4 x 8 x 18 in. Capacities range from 1000 to 12,000 lb per hour. The units take 16 to 36 sq ft of floor space. Cycle times, ranging from 1½ to 4 minutes, can be controlled with a rheostat. Prices start around $3000. Manpro says its unit can be used for other processes, including phosphating, bright dips, and oil quenches.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

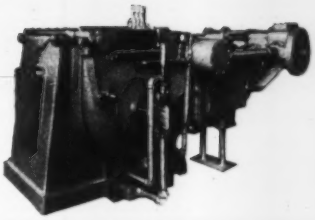
Dann Goodson, *Manager Motor-Driven Compressor Sales, The Cooper-Bessemer Corporation, explains...*

How National Tube steps up production

Lorain Works of National Tube Division, United States Steel Corporation, is increasing ingot output by injection of oxygen into open hearth furnaces. Introduced by lances extending through the roof down into the furnace, the oxygen speeds up production. It is fed directly into the metal in a volume of 28,000 cu. ft. per hour per furnace.

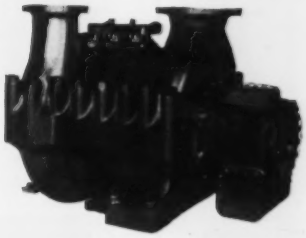
Another major use of oxygen at the Lorain Works is for hot bloom scarfing. The machine shown here removes seams and other defects, conditions blooms for rolling into top quality products. Entire operation is automatic, push-button controlled.

The 2000 hp Cooper-Bessemer Type JM Air Compressor, shown here, plays an important part in the manufacture of the oxygen used for these and other operations at the Lorain Works. This is a 4-stage unit,

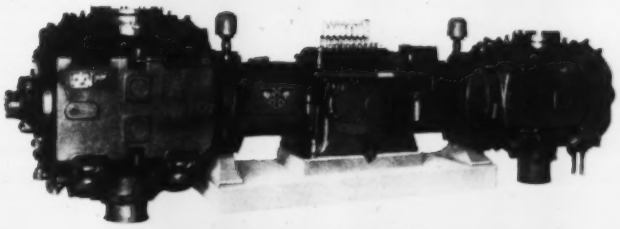


EXPANSION ENGINES

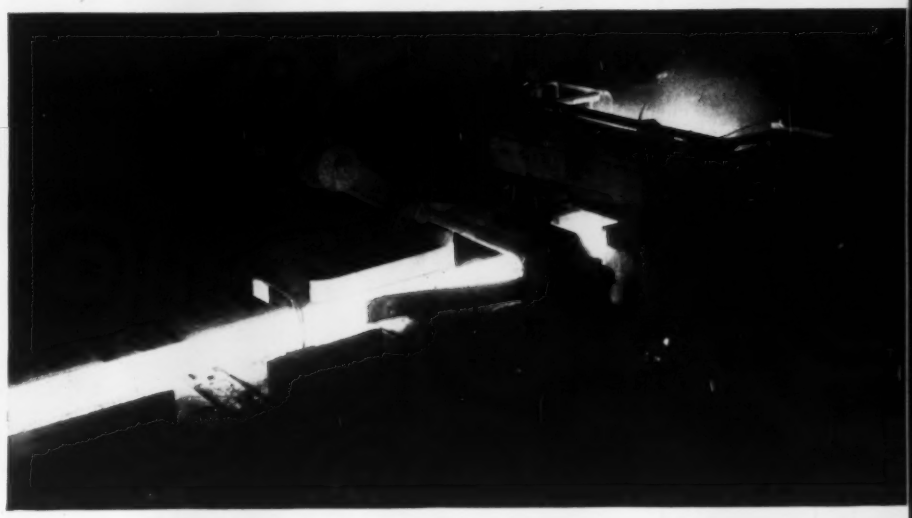
Cooper-Bessemer products for oxygen production include reciprocating and centrifugal compressors, expansion engines and En-Tronic controls.



CENTRIFUGAL COMPRESSORS



RECIPROCATING COMPRESSORS



Hot scarfing machine at Lorain Works steps up deseaming speed, boosts uniformity of this conditioning process.

with oxygen

operating at 300 rpm with a discharge pressure of 1000 lbs. The plant was designed and built by American Messer Corporation.

Cooper-Bessemer can supply all types and sizes of reciprocating or centrifugal compressors, expansion engines and En-Tronic® controls for oxygen production. Call our nearest office for engineering service when you start to plan your facilities.

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Welding Machines Keep Up with Missile Needs

Rocketry is making big demands on welding technology and machines.

Most requirements range from small automatic machines that weld 0.005 in. tool steel to large (75,000 lb) automatic machines that weld intricate precision components for the casing of solid fuel engines.

Some unusual requests have been filled by Lewis Welding & Engineering Corp., Bedford, Ohio.

• **Speedy Delivery**—Lewis received a hurry-up order to design and build a machine to weld first stage fuel tanks for an ICBM.

The customer received the unit 71 days after Lewis put the design on paper.

Another problem involved welding an ultrathin section which must be preheated to 600° F and joined by inert gas arcwelding. Electric heating elements at the weld area solved the problem and eliminated cooloff and scrap difficulties.

• **Part Preparation**—A large fuel tank required part edges to be machined for perfect welding fit-up. The tank was made of thin sheets and included conical or elliptical heads.

Automatic equipment solved machining and joining problems.

AISE to Meet in Chicago

The annual convention of the Association of Iron & Steel Engineers is slated to open today (Sept. 28) and continue through Oct. 1, at Hotel Sherman, Chicago.

Automatic gages and controls will get a big share of the engineers' attention. Automation of strip mills, blooming mills, and slabbers will be discussed. Special attention will be given to control systems for blast furnaces and gas mixing stations.

Emphasis will also be placed on basic refractories (still gaining popularity in the steel industry) and mercury arc rectifiers for mill drive systems.

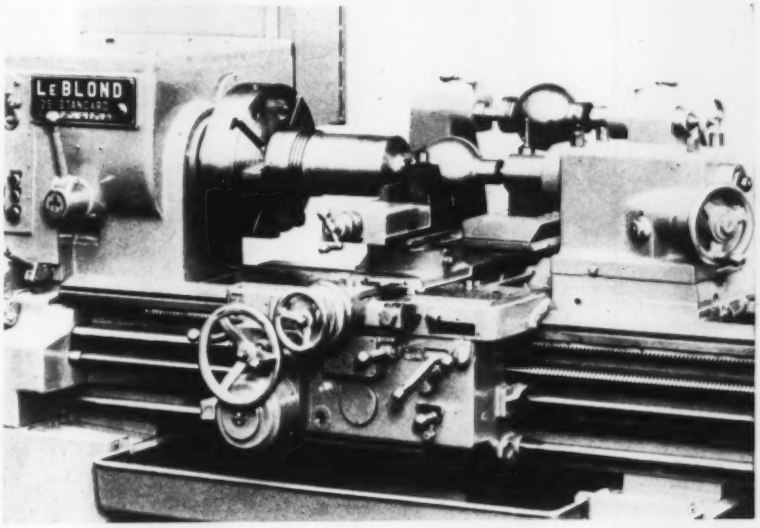
Lathe Tracer Will Handle Heavy Duty Jobs

SUCH ITEMS as stepped shafts, cones, sheaves, and balls can be turned on the LeBlond 90 degree tracer. The unit is designed for LeBlond heavy and standard duty lathes.

A master workpiece can be used for a template, or a template can be cut from flat stock. The template is mounted between centers behind the workpiece, and the tracing stylus contacts it from below. Motion is transmitted directly from the tracer cylinder to the tool turret by a solid steel bar. Hydraulic elements and hoses are rear mounted.

The tracer has in and out rapid traverse up to 80 in. per minute and variable hydraulic feed up to 45 in. per minute. Switching from the tracer to standard operation or back again takes only 30 seconds.

Models are available for 16, 20, 25, 32, and 40 in. standard duty and 13, 16, 20, 25, and 32 in. heavy duty lathes.



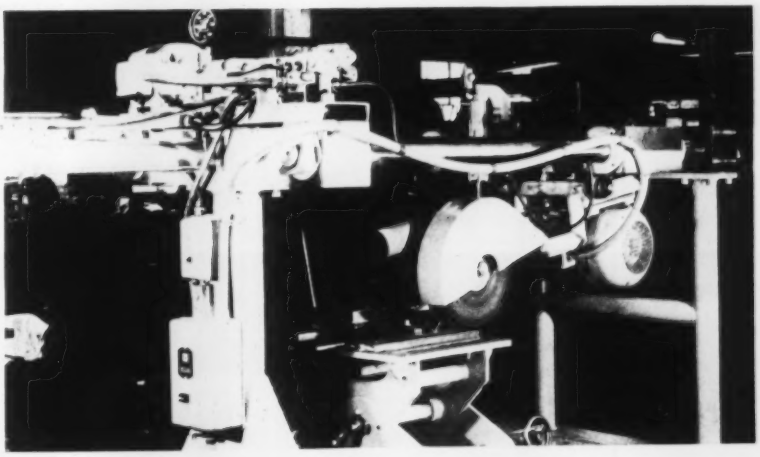
For more information, *write* R. K. LeBlond Machine Tool Co., 1947 Edwards Rd., Cincinnati, Ohio.

Abrasive Cutoff Machine Slices Large Sections

HERE'S an oscillating type, abrasive cutoff machine with fine finish and high speed cutting characteristics, says the manufacturer. Surface finishes of 50 microinches or less can be produced. The unit can cut through 60 lb per ft sections of standard channels in 60 seconds.

Traverse feeds are vernier controlled. A thumb switch controls traverse movements.

Three sizes are available: The smallest unit is a 15 hp dry type with a 20 in. wheel and a 24 in. stroke; it can cut shapes equal to a 24 x 6 in. I-beam. The 20 hp unit is a dry type with a 26 in.



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- Modern new Presidential Suite.
- New stores and guest services.
- New charcoal grill specializing in steaks, ribs and chops.
- New popular priced coffee shop "The Minute Chef"—for busy people.
- And many more new developments.

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meal time
night time
any time

Minute Chef
Bronze Room
The Patio
Transit Bar

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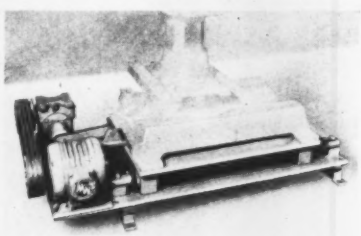
wheel and a 30 in. stroke; shapes equal to a 30 x 8 in. I-beam can be cut. The largest unit is a wet type with 40 hp, a 34 in. wheel, and a 36 in. stroke; it can cut shapes equal to a 36 x 12 in. I-beam.

For more information, *write* Wallace Supplies Mfg. Co., 1300 Diversey Parkway, Chicago 14, Ill.

Oscillating Platform Helps Buffing, Polishing

ITEMS such as polishing and buffing heads which require oscillation may be mounted on a Murray-Way platform. It eliminates wear from oscillating the work spindle through its bearings.

The platform is mounted on heavy lateral bearing rails which hold the head in absolute alignment. The polishing head is bolted to the steel platform. A cam activated arm and a drive reducer move the entire head and mounting back and forth.



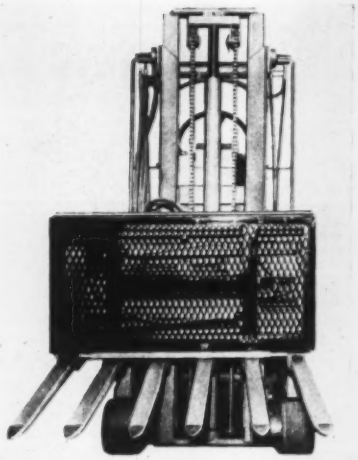
The unit is designed to use any of Murray-Way's standard non-oscillating, polishing, buffing, or grinding heads and will greatly improve their performance, says the manufacturer. Models are available for heads weighing up to 3000 lb.

For more information, *write* Murray-Way Corp., P. O. Box 180, Birmingham, Mich.

Pallet Handling Problems Eased by Pushoff Device

A PUSHOFF device with side shifter and multiple forks can handle palletized unit loads in process or storage and nonpalletized loads during shipment.

Palletized loads are handled in the conventional manner. When loading carriers, the multiple tined



forks slide between small stringers on the top of the pallet. The load is raised off, moved to the carrier and pushed off the forks.

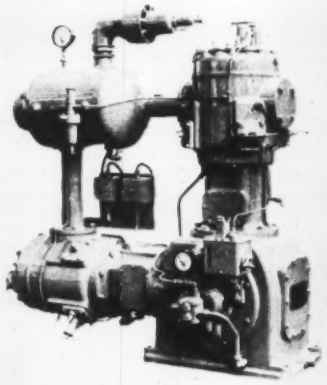
Either wood or steel pallets may be used with the pushoff device. The wood design has four or six stringers (2 in. square) equally spaced and nailed across the top boards.

For more information, *write* Lewis-Shepard Products Inc., 125 Walnut St., Watertown 72, Mass.

Booster Compressors Help on Long Lines

HERE'S one of two booster type compressors that are designed to deliver 590 to 1180 cfm of air through long lines at 100 psi. Minimum intake pressure is 45 psi.

The double acting, single stage machines are air cooled. Both units operate at 730 rpm. Special valve designs keep normal discharge velocities and air temperatures down. Integral safety devices on the units



The X-ray fluorescence analyzer, one of the many modern instruments in the chemical laboratory, helps Jessop make certain you get the specified per cent of each alloy in your specialty steel.

"How X-rays help Jessop give you exactly what you want in alloy steels . . ."

—C. M. Carlisle, Director of Analytical Chemistry

"What's happening here? As the stylus in the X-ray fluorescence analyzer draws red lines on the graph, the Jessop chemist determines the exact per cent of each alloy in a sample of specialty steel.

"Based on this analysis, the melter may ask for the addition of, say, molybdenum to the molten steel now in electric arc furnace No. 3.

"How's it done? Bombarded by X-rays, the alloys in the sample of steel are radiating secondary rays. Converted into electrical energy, the rays are causing the stylus to move and draw red lines on the graph . . . indicating the types and per cent of alloys in the steel sample."

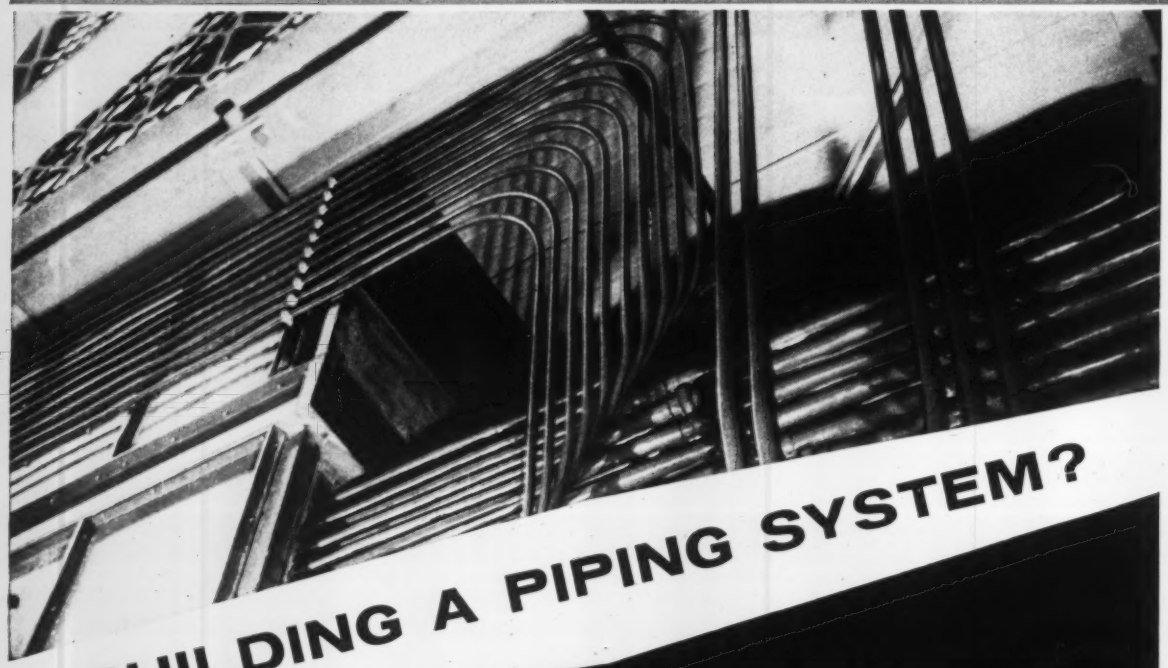
In the Jessop chemical laboratory, the X-ray fluorescence analyzer and many other modern instruments help us make certain you get the exact chemical composition specified in your order. This chemical laboratory is one more reason for your confidence in ordering specialty steels from Jessop. *Specify Jessop . . . and then relax!*

JESSOP
STEEL COMPANY
Washington, Pennsylvania

VMA 6720

Subsidiary Companies:
Green River Steel Corporation, Owensboro, Kentucky • Jessop Steel International Corporation, New York City
Jessop Steel of Canada, Ltd., Wallaceburg, Ontario • Steel Warehousing Corporation, Chicago, Ill.

Stainless, alloy, tool, cast-to-shape, and forging steels, precision ground flat stock, and other specialty steels



BUILDING A PIPING SYSTEM?

OPERATING ADVANTAGES

- Easy to join
- Stream line flow
- Less space required
- Close work possible
- Easy to bend
- Light in weight
- Leak proof joints

STEEL
NEW SMOOTHWELD TUBING SAVES DOLLARS

Major automobile manufacturer has installed over 25 miles of SMOOTHWELD made by The Standard Tube Company to make up their paint distribution system. Information available upon request!

By using light smoothweld tubing with one end belled you can save a great deal of money in material and installation cost and get an extremely efficient piping system. Your installation costs are much reduced with the use of brazed or soldered joints rather than threaded or welded connections. The tubing can be bent easily with regular pipe bender. The belled end on each tube eliminates the need for couplings. Complete fittings are available in malleable iron or wrought steel. Standard Engineers are anxious to work with you in planning your piping system job.

FREE

A Special folder on SMOOTHWELD steel tubing designed for piping systems. Write address at the right.

STANDARD

THE STANDARD TUBE COMPANY and MICHIGAN STEEL TUBE PRODUCTS DIVISION

24400 Plymouth Road • Detroit 39, Michigan

Welded stainless tubing and pipe • Welded carbon steel mechanical • Boiler and Heat Exchanger Exclusive rigidized patterns • Special Shapes • Oil Well Tubing and Casing Light Weight Pipe • Steel Tubing—Sizes: ½" OD to 6" OD—.028 to .270 wall Stainless Pipe and Tubing—Sizes ¼" OD to 4¾" OD—.020 to .187 wall.

TUBE TALK

During the coming months this column will give us an opportunity to pass on information about new products, developments, and ideas that pertain to the steel tube industry.

A new product of interest to the building trades, plant maintenance engineers, and steel pipe distributors is **Smoothweld** lightweight tubing for brazed or soldered joints —designed and pioneered by us **to save money in piping systems** where internal corrosion is not a factor.

Each length is expanded at one end and joining can be done by simply heating the ends and applying solder. The result is a positive leakproof joint. The inside of the tube at the joint is smooth and free of projections or depressions . . . thus permitting the flow of fluids or gasses with a minimum of friction loss.

This was a prime reason for **the use of Smoothweld tubing by the Ford Motor Company** for more than 25 miles of paint lines in the Lincoln Assembly Plant at Wixom, Michigan. Another installation of 160,000 feet was just completed in a new plant of another major automotive company.

The Standard Tube Company initiated a research project with a great university on the fluid flow characteristics of **Smoothweld** tubing with brazed joints versus standard pipe. It shows a greatly **reduced resistance** to flow for **Smoothweld** thus permitting less pumping capacity requirements and better flow.

A copy of this study may be obtained by dropping me a request on your company letterhead.

An important new specification for structural tubing is under preparation and will be available this fall. Watch this column for more information.

THE STANDARD TUBE COMPANY

LELAND M. HOGAN
Vice-President

NEW PRODUCTS and equipment

operate if pressures on the suction sides drop below preset minimums.

The larger model (2800 lb, AG 1-2) is equipped with a pulsation damper. The model is about 5 ft high, 5 ft wide, and 31½ in. deep. The smaller unit (2300 lb, AG 1-1) is not equipped with a pulsation damper.

For more information, *write* Atlas Copco Eastern Inc., 610 Industrial Ave., Paramus, N. J.

Variable Speed Pulley Features Easy Lubrication

THE LUBRICATION system on the Worthington variable speed drive motor pulley has free grease distribution to bearing points. Pulley sizes range from 1 to 15 hp.

The single lubrication point is on the end of the pulley. A grease reservoir eases maintenance.

The unit has a single movable flange and totally enclosed separate spring cartridges. The pulley can be mounted on Worthington's Angle-Matic motor base. The base is designed to maintain proper belt tension through the entire range of speed change.

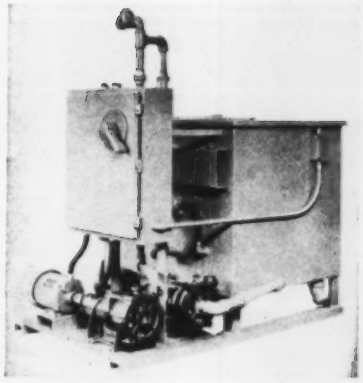
For more information, *write* Worthington Corp., 401 Worthington Ave., Harrison, N. J.

Solution Controller Works Automatically

THIS electronic solution controller can be used with caustic, acidic, or aqueous solutions. It can control continuous or batch type metal washing equipment, plating processes, chemical process systems, or other applications where precise concentrate levels must be maintained.

A complete system consists of a concentrate level setting control, a sensing electrode, a magnetic amplifier, a pump assembly, and a combination compound and concentrate holding tank.

Operation: When the solution level in the holding tank falls below a preset point, the pump is automatically actuated and sprays a wash solution on the dry compound (or liquid concentrate) until the desired level is reached.



For more information, *write* Electro Mechanisms Corp., 7301 Ridgeway Ave., Skokie, Ill.

Belt Conveyor Series Offers Economy, Low Cost

ECONOMICAL operation and low initial cost are designed into the Series L belt conveyors. When equipped with nonslip belting, they're efficient for interfloor movement of goods or for booster use in a gravity conveyor line, says the maker. Models with smooth belting are suitable for assembly line or processing table use.

The conveyors are furnished in 2½ ft increments in 12, 16, 20, and 24 in. belt widths.

For horizontal units, total load capacity at 50 fpm with a 1 hp motor is 900 lb for the slider and 2400 lb for the roller. For an inclined conveyor (25 degrees), load capacity is 400 lb for the slider and 600 lb for the roller.

For more information, *write* E. W. Buschman Co., Clifton and Spring Grove Avenues, Cincinnati 32, Ohio.

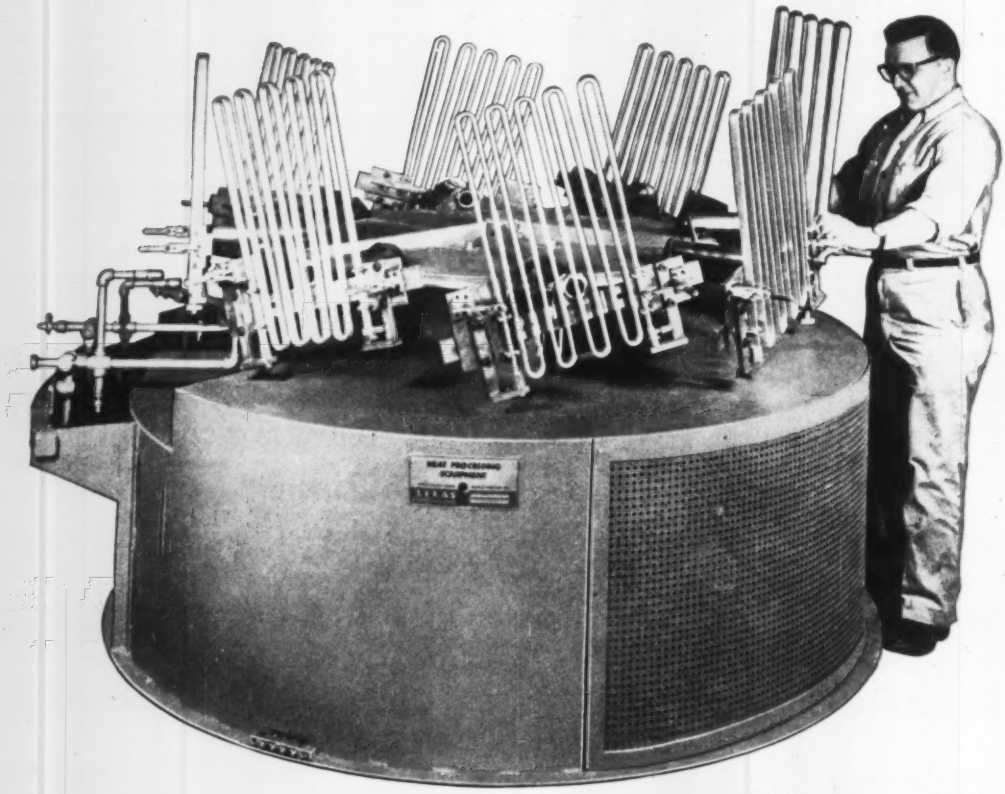
Silicon Rectifier Charger Lops Time Requirements

SINGLE shift charging of 24 volt industrial batteries is possible with the automatic charger called Auto-Reg. Skilled men aren't needed.

It can handle 12 cell units up to 600 ampere-hours in capacity. An automatically regulated, constant potential circuit assures a safe charge regardless of battery condi-

(*Please turn to Page* 158)

IMPROVE YOUR PRODUCT... LOWER YOUR COSTS
... with Selas Automatic Heat Processing



BRAZING: Manufacturer of air-conditioning equipment gets consistently high quality return bends with this custom-built Selas automatic brazing machine. Occupying floor space of only 6 ft x 6 ft, the compact machine simultaneously brazes an aluminum fitting onto each end of an aluminum serpentine coil, at production rate of 130 assemblies per hr. Fixtures are readily interchangeable to accommodate various workpiece sizes. Machine is designed and built to meet changing heat cycles and production demands. Labor cost reduced over hand-torch brazing method previously used.

Selas automatic machines are extensively used for production heat processing operations, including annealing, heat treating, brazing and soldering, forging and localized hardening.

The installations shown on these pages demonstrate how Selas automatic heat processing equipment can:

- increase production speed
- save fuel and operating costs
- minimize in-process inventory
- reduce manpower requirements
- save valuable floor space
- improve product quality

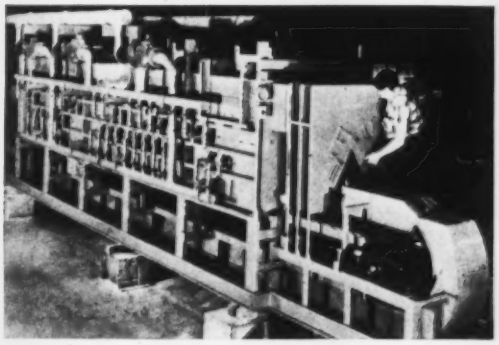
Individually designed and custom-built to meet your specific production requirements and job specifications, Selas automatic machines employ time-proven standardized engineering features for longtime operating dependability and minimum initial cost. In addition, you avoid problems usually associated with divided responsibility since Selas starts-up and services every machine it designs and builds.

A Selas automatic machine can prove beneficial in your plant. At your convenience . . without cost or obligation to you . . a Selas field engineer would welcome the opportunity to survey your needs.

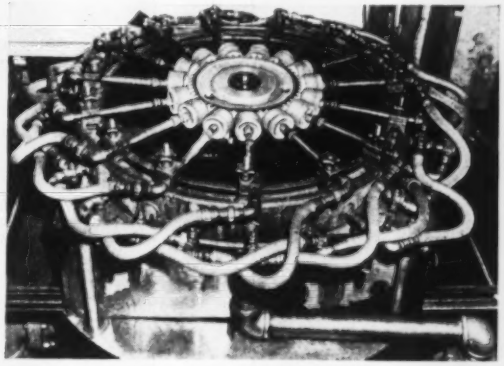
For this personal service—or for literature on any of the heating operations shown on these pages—write to Mr. W. B. Troupe, Asst. Mgr., General Industry Div., Selas Corporation of America, Dresher, Pa.

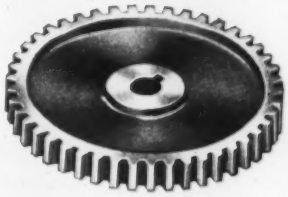
Duradiant and Gradiation are registered trade names of Selas Corporation of America

SUBSIDIARIES: Selas Constructors, Inc., Houston, Texas; Selas Corporation of America, European Div., S. A., Pregny, Geneva, Switzerland.
INTERNATIONAL REPRESENTATIVES AND LICENSEES: CAMBODIA, FORMOSA, KOREA, LAOS, VIETNAM—Coso Export Co., Inc.; AUSTRIA, GERMANY—Indugas, Essen; JAPAN—International Machine Co., Ltd., Tokyo; ITALY—Italiana Gasogeni E. Forni S.r.l., Milano.

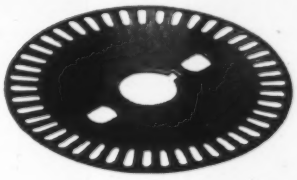


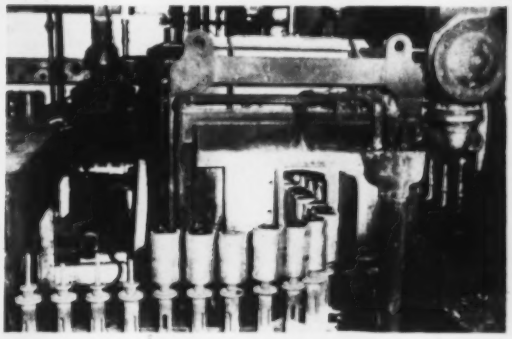
HEATING FOR FORGING: This Selas automatic machine heats arrowhead-shaped cultivator sweep blanks, for subsequent forging and bending, at the rapid rate of 1200 per hr, reducing fuel requirements 65% and synchronizing the heating operation with other production-line processes. The sweep blanks are conveyed point-up through the narrow heating chamber, with strategically-located Duradiant® burners firing on them from both sides at close range. Close proximity of the direct-fired burners to the workpieces makes it possible to achieve the variable temperature pattern required for the hot forming operations, in less than 3 min.





SELECTIVE HARDENING: Gradiation® heating provides rapid heat transfer rate without flame impingement in this flame-hardening unit which heat treats teeth of large gears used in tractor-mounted towing winches. Selas heating reproduces controlled hardness pattern from tooth to tooth, gear to gear. Gear blanks can be machined in normalized and tempered condition (Bhn 180-220), saving 27% in overall machining time. Strength, wear resistance, toughness are improved, permitting up to 20% reduction in gear face width. Speed and controllability of heating permit use of C1046 carbon steel instead of previously-required alloy steel.





ANNEALING: Electric motor stator and rotor laminations are annealed in this Selas Gradiation automatic machine to develop required electrical characteristics. Laminations, 2½ in. to 10 in. O.D., stacked 6 in. high on spindle fixtures, are carried through Duradiant-burner-fired heating tunnel, then through water-jacketed chamber for controlled cooling. Entire annealing cycle takes only 35 min, extremely fast compared with conventional methods. Interchangeable fixtures permit accommodation of wide range of stator lamination stacks, rotor lamination stacks, as well as stators and rotors in finished form.

HEAT TREATING: Compact, automatic, conveyorized Selas machine heat treats electric motor shells, pole pieces and other small metal parts . . . at rate of 900 lb of parts per hr. Uniform heating assured by Duradiant burners in side-walls above and below conveyor belt, improves magnetic properties of shells; produces a tight, thin, oxide surface to which finishing paint adheres for a lasting finish. After heating to 1400°-1500°F, motor parts pass through controlled cooling cycle in an atmosphere of combusted gases, followed by quench in corrosion-inhibiting media.

SELAS
CORPORATION OF AMERICA
DRESHER, PENNSYLVANIA

Heat and Fluid Processing Engineers
DEVELOPMENT · DESIGN · CONSTRUCTION

tion or alternating current line variations as great as ± 15 per cent.

During the first 6 to 6½ hours of charging, voltage output is below gassing point of the cells. The rest of the charge is at a voltage high enough to complete the charge in 8 hours (even for fully discharged batteries). Silicon rectifiers are used.

For more information, *write* C & D Batteries Inc., Washington and Cherry Streets, Conshohocken, Pa.

Soluble Cutting Oil Aids Soft Alloy Machining

CUTTING PROBLEMS in soft alloys can be reduced with an oil designated Type AL-HD, claims the manufacturer. It's formulated for maximum stability in cutting alloys such as aluminum and copper.

The oil can lengthen tool life, reduce downtime, and require fewer sharpenings and dressings, says the maker. Finer surface finishes can be obtained on such operations as boring, broaching, drilling, hobbing, tapping, and turning.

The fluid is chemically neutral over a wide range of temperatures and operating conditions. Low temperatures in shipment or storage do not affect the fluid. It can be left in machines during shutdowns without skimming, gelation, sedimentation, or sludging.

Rust inhibition properties are excellent, says the maker. The oil is nonfoaming, nonsmoking, and develops no offensive odor even after long use. An additive helps to protect users against dermatitis.

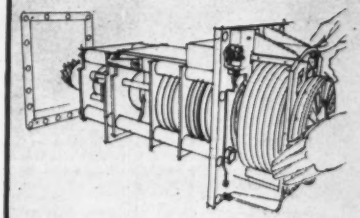
For more information, *write* Shear - Speed Chemical Products Div., Michigan Tool Co., 7125 E. McNichols Rd., Detroit 12, Mich.

Device Presets Jigmil Positioning

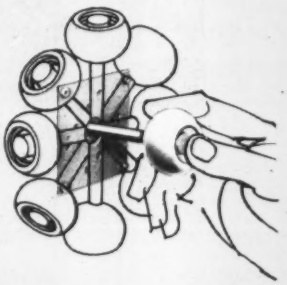
USERS of DeVlieg Spiramatic Jigmils now can get a direct dial system to simplify presetting dimensions for automatic point-to-point positioning.

By eliminating measuring rods, Diatrol allows direct dialing of positive or negative dimensions from any arbitrarily selected reference plane within the range of the control system.

The system utilizes compact plug-



Teletorque transmission—A completely new and advanced concept in power transmission. Coaxial design makes possible a compact machine that is more rigid and more productive. Constant-mesh gears are automatically "linked" in combinations which provide 32 table speeds through electromagnetic clutch brakes.



Directional "joy-stick" control—A magic circle "joy stick" at each control center speeds operation and eliminates fatigue. The tool goes the way the operator moves the stick. Increases skill and reduces learning time.

Fastest VTL

- 34", 42", and 52" sizes
- Broadest feed range
- Highest and broadest speed range
- Single dual-direction feed and traverse handwheel
- Circular scales and microdials
- Directional rail controls at the operator's station
- Fully gibbed rail—always level
- Counterbalanced heads
- Integral bed and column
- Least floor space
- Constant cutting speed available with a-c drive
- First VTL available with numerical control

Symbol for machining cost reduction

GIDDINGS & LEWIS

VTL-101

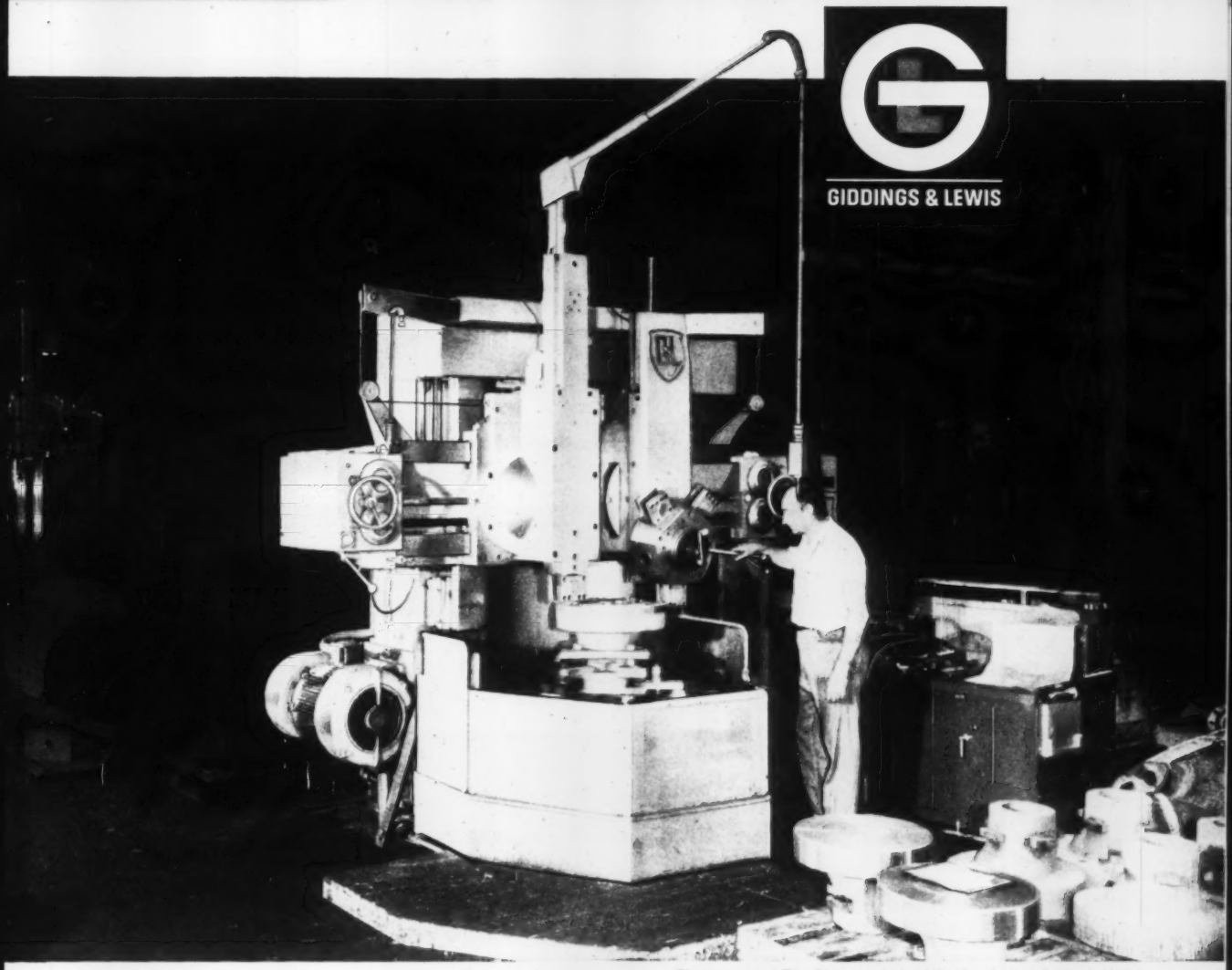


Photo courtesy The Chapman Valve Mfg. Co., Indian Orchard, Mass.

. . . change feeds and speeds "on the fly"
. . . eliminates stop-and-go machining

Here is a totally new kind of vertical turret lathe—the world's most compact, fastest, and easiest to operate! It's powered, constructed, and geared for highest cutting speeds to slash the cost of boring small holes, turning long pieces, and facing wide surfaces. All functions are actuated and controlled electrically with simplicity that saves hours of hard work and puts more parts on the floor at the end of the day.

You can change feeds and speeds while the tool is in the cut and the table is turning. Tool life, finish, and accuracy are improved because the operator always works at the right speed. Now you can capitalize on throwaway tooling, not only by increasing cutting speeds, but by eliminating stop-and-go machining.

With a G&L VTL minimum time is spent with the machine idle or cutting air. As a result, the operator spends more time doing productive work.

Controls are in an ellipse area for fast, easy operation. One-hand pendant control operates the table, including speed, start, stop, and jog. The machine is easy to get around, takes 30% less floor space than machines of comparable capacity.

For complete details and descriptive literature, call your Giddings & Lewis distributor or write directly to the factory.

GIDDINGS & LEWIS MACHINE TOOL COMPANY

Fond du Lac, Wisconsin

Giddings & Lewis manufactures: vertical and horizontal boring machines, vertical turret lathes, planers, planer mills, contour milling machines, die sinking machines, drilling machines, numerical and tracer control systems, boring tools and related items, and machine tool accessories.

in units containing transistorized electronic circuitry for dependability and easy replacement.

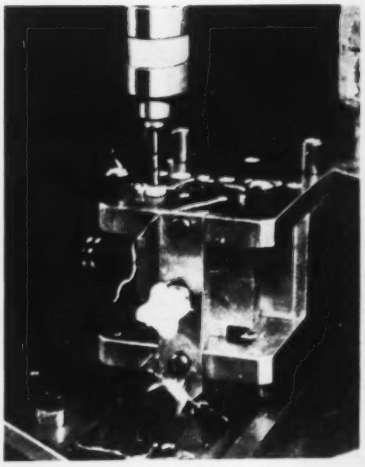
The measuring portion of the system can be calibrated precisely, and the measuring, positioning, and control elements are completely protected to insure continuous and trouble-free performance.

For more information, *write* DeVlieg Machine Co., Fair Street, Royal Oak, Mich.

Torque Sensitive Driver Prevents Tool Breakage

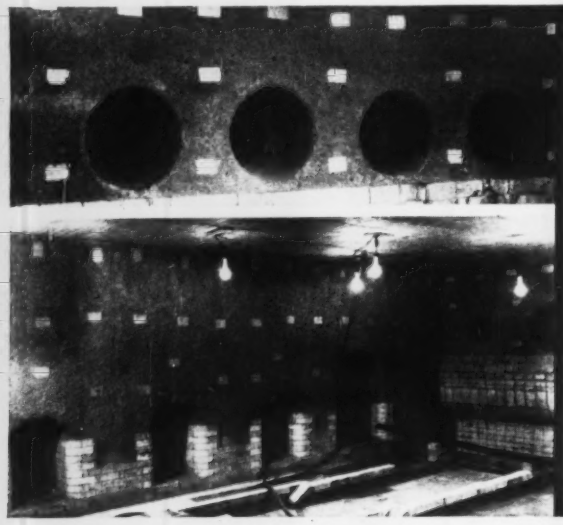
HERE'S a driver with a clutch that can help you eliminate tool breakage in manual feed drilling and reaming operations. The unit is adjustable and can be adapted to standard machine spindles and drill chucks. Compact design makes the driver suitable for close center, multiple spindle operations, says the maker.

The clutch drives through rollers



wedged between cams and releases instantly at the preset limit. After the rollers overrun the drive cams, the clutch is free wheeling and transmits no torque from the machine spindle to the tool. No objectionable noise, impacting, vibration, or overheating is caused by continued rotation.

For more information, *write* Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.



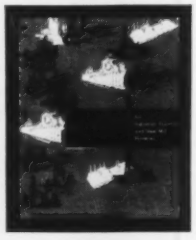
PLIBRICO "Super" and PLIBRICO "Super F" plastics form a continuous, fully-anchored monolithic lining for the side walls and burner walls, with smooth contours around the door arches and burner cones, in this Salem-Brosius slab reheating furnace.

Plibrico plastic refractories selected at Inland Steel Co. for 130 tons/hr slab reheating furnace

Properties of Plibrico "Super" and Plibrico "Super F" plastic refractories are geared to the demands of this 99′ triple-fired slab reheating furnace placed in service in 1958 at Inland's 76″ mill. Capable of withstanding severe conditions, Plibrico "Super" lines the preheat zone, while Plibrico "Super F" lines the high heat and soaking zones.

Less maintenance—longer service life assured . . . formulated specifically for tough assignments, Plibrico "Super F" is highly resistant to stresses, vibration, mechanical and thermal shock. It is exceptionally stable, and with its low porosity resists destructive penetration of otherwise harmful combustion by-products.

For furnace linings that cost less and last longer, call your local Plibrico distributor-engineer . . . WRITE FOR CATALOG 69 covering steel mill, industrial and foundry applications



Plibrico REFRACTORIES

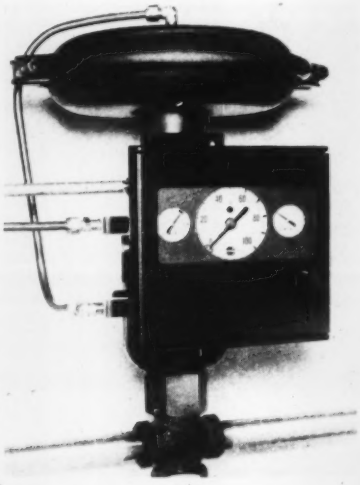
Serving the Furnaces of Industry 24 Hours a Day
PLIBRICO COMPANY, 1806 Kingsbury, Chicago 14
Plibrico Sales & Service Throughout the World
REFRACTORY PRODUCTS · ENGINEERING · CONSTRUCTION

9360

Pneumatic Instrument Serves Two Functions

THE Pilot Positioner is both an indicating pneumatic controller for temperature or pressure and a valve positioner which amplifies air power to operate a control valve.

Because it is close to the process and valve it controls, the instrument minimizes transmission lags and provides precision and speed in



A NEW ERA IN RELAY LIFE AND RELIABILITY!

A-B QUALITY

THEY MAY LOOK ALIKE, BUT

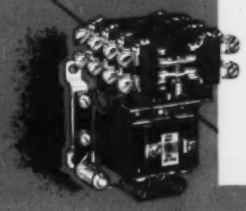
these new relays completely outmode the usual concepts of relay life and reliability.

For years the Allen-Bradley Bulletin 700 Type B and Type BX relays have been preferred for their long life and their consistent, trouble free operation. In having produced millions of these relays, we learned how to improve them. Thus, the new line of Type B and Type BX relays was designed to set a new level of performance standards.

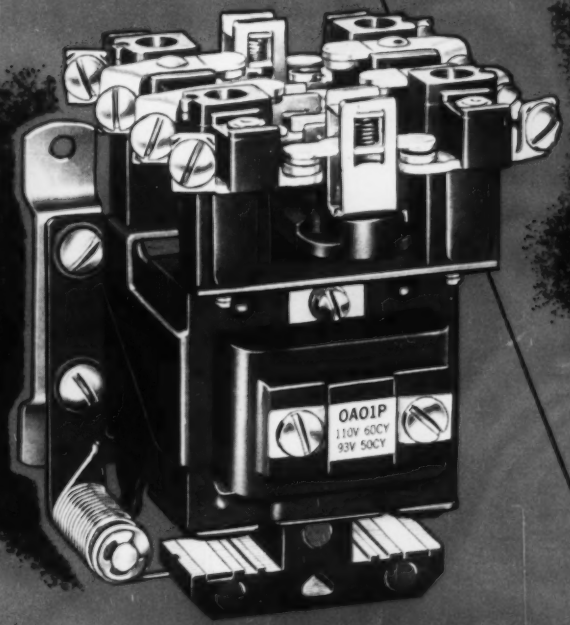
Turn the page and see the outstanding features of these new Bulletin 700 Type B and Type BX relays. For the same price, they offer you even greater value, greater reliability.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

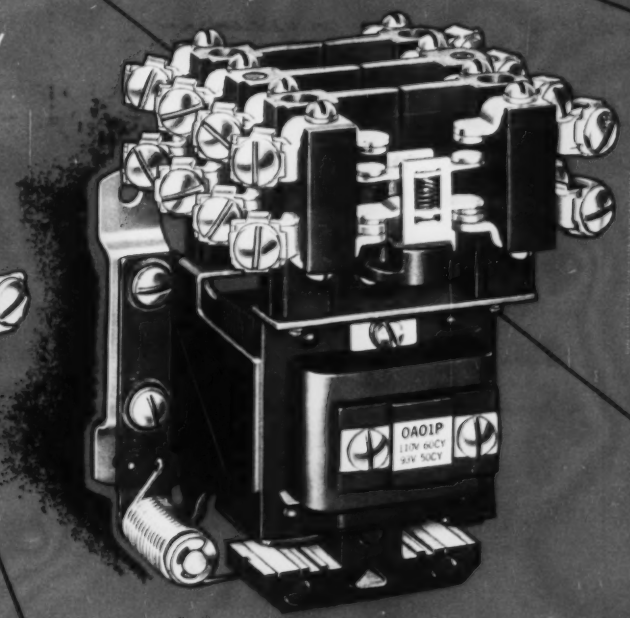
old Bulletin 700
Type B-400 Relay
with 4 N.O. contacts



old Bulletin 700
Type BX-440 Relay



new Bulletin 700, Type B-220A
AC Control Relay with 2 N.O. and 2 N.C. contacts



new Bulletin 700, Type BX-440A
AC Control Relay can be wired for normally open or normally closed contacts

ALLEN-BRADLEY
Member of NEMA
QUALITY MOTOR CONTROL

7-59-MR

NEW BULLETIN 700 RELAYS

TYPE B AND TYPE BX

provide these improved features

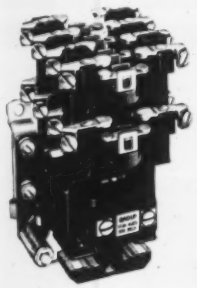
1. New mechanical design gives *at least* 5 times greater operating life.
2. New contact motion provides 10 times greater electrical reliability.
3. Compact construction—new relays are structurally improved with no change in size.
4. Complete interchangeability. Mounting dimensions of new relays have not been changed.
5. Rugged, high efficiency cast plastic coil. New, improved coil fits *all* Bulletin 700 relays.
6. New, stronger, movable contact crossbar—fits Bulletin 700 relays now in service.
7. Improved stationary contact blocks. These new blocks can also be used on present models of the Bulletin 700 relay.
8. Increased life and reliability—*no increase in cost.* These new, improved relays are priced the same as previous Allen-Bradley models.
9. The letter A is added to the Bulletin 700 relay type number merely to distinguish the new line.
10. These new relays are Allen-Bradley's "thank you" to our many customers who have bought millions of Bulletin 700 relays over the years.

A-B QUALITY

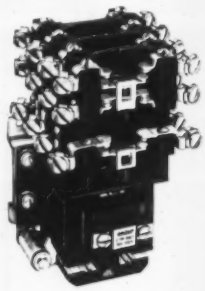
The old Bulletin 700 relay was first placed on the market some 25 years ago. Today, millions of these relays are in daily service—all over the world.

None of the old relay "values" have been lost in the new designs. Instead, these "values" have been greatly improved. The new relays feature a simplified, longer life, solenoid construction. The double break, silver alloy contacts are the same—always in perfect operating condition—without cleaning or filing. The operating coil has been greatly improved—it cannot be damaged by atmospheric conditions, no matter how severe.

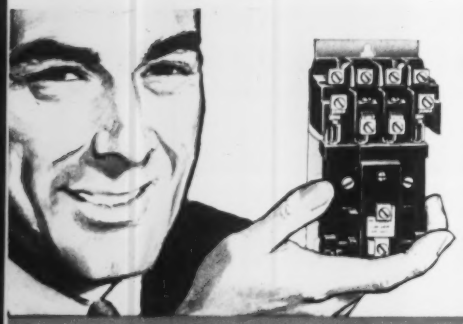
No one can deny the popularity of the older Bulletin 700 relays. The new relays—with their superior features—will be an even better answer for any and all relay applications.



TYPE B, GENERAL PURPOSE
Bulletin 700, 8-pole relay. Made with 8 N. O. and no N. C., or up to 4 N. O. and 4 N. C. contacts.



TYPE BX, UNIVERSAL
Bulletin 700, 8-pole relay with both N. O. and N. C. contacts. Changeover is made by reconnecting incoming lines.



HERE IS ANOTHER REMARKABLE ADDITION TO THE ALLEN-BRADLEY RELAY LINE

It's new . . . and it's different. This unusual Bulletin 700 convertible contact relay has contacts that can be changed from normally open to normally closed operation (or vice versa)—in just moments. A screwdriver is all it takes to do the job—no additional parts are needed. Like all A-B relays, it's good for millions of trouble free operations. Watch for announcement and full details of this new convertible relay soon!

ALLEN-BRADLEY

Member of NEMA

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wisconsin
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

7-59-MR

QUALITY MOTOR CONTROL

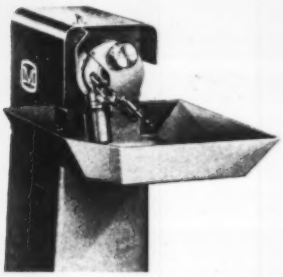
valve positioning. It can be mounted by the valve manufacturer on most makes of diaphragm motor valves or certain other types of pneumatic operators, and requires only one air supply.

For more information, *write* U. S. Gauge Div., American Machine & Metals Inc., Sellersville, Pa.

Drill Point Grinder Has Production Speed

HERE is a production grinder that is designed to take care of conventional, formed, or split points on a precision basis. All grinding is done wet. An integral pump is used.

A V-rest drill holder securely holds and positions each drill and eliminates loading, or adjustment of bushings, jaws, or collets.



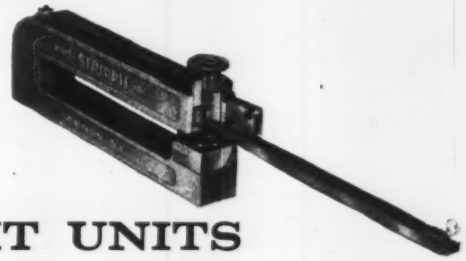
Other features: A calibrated swivel fixture can grind conventional points with an included angle of 118 to 150 degrees. Provision is made to point drill sizes from 1/16 to ½ in. in diameter and up to 6 in. long.

Fixtures are available for angles less than 118 degrees and for extending drill length range to 12 in. The unit can be adapted for split pointing and helicentric pointing at production rates.

For more information, *write* Morse Twist Drill & Machine Co., New Bedford, Mass.

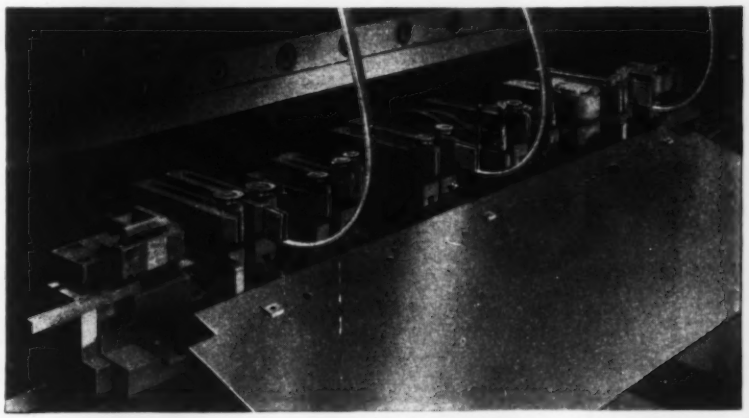
Barrel Finishing Machine Compact, Easy to Load

YOU CAN PUT this horizontal barrel finishing machine in 5 sq ft of floor area. The Baird Finishmaster is low (less than 4 ft) so all



NEW STRIPPIT UNITS

. . . stake nuts permanently with every press stroke!



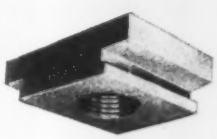
STRIPPIT PIERCE NUT UNITS save operations, time and money in assembly panel production with single-stroke insertion of Fabristeel Multipierce Nuts* into sheet metal up to .125" thick.

Permanent Fastening by an Exclusive New Process—as nut pierces stock, metal flows into nut shoulder slot, becoming an integral part of the stock.

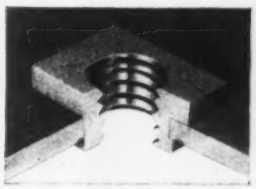
High-Speed—fast press setups, automatic feed of nuts to units for long, medium or short runs gets maximum production per press.

Flexibility—Pierce Nut Units can be quickly press-mounted in any desired pattern, changed on short notice, re-used over and over.

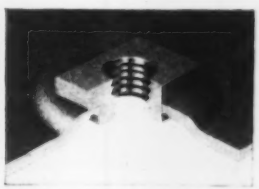
*A Product of Fabristeel Products, Inc.



Each nut is its own punch, a new one each time



Die button causes material to flow into nut slot



Simultaneous embossing for flush fastening

WRITE FOR DEMONSTRATION on your press! The speed and simplicity of Strippit Pierce Nut operation has to be seen to be believed. Also request new catalog for complete specifications.

WALES STRIPPIT INC.

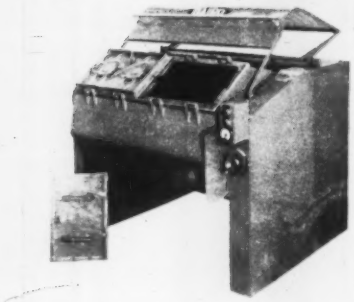
210 Buell Road, Akron, New York

In Canada: Strippit Tool & Machine Company, Brampton, Ontario

HOUDAILLE INDUSTRIES INC.

loading and unloading equipment can be carried over the top of the machine.

Armor plate doors are lightweight and can be lifted by hand. The barrel guard swings out of the way for easy loading. Front mounted controls enable machines to be placed side by side. A lifting plate is located under the drive unit for fork truck use in moving.



Other features: A variable speed drive provides barrel speeds between 8 and 24 rpm. An integral brake-motor holds the barrel in position. A limit switch permits jogging when the guard is raised.

Standard equipment includes an automatic timer, automatic pressure relief valve, and barrel speed controls.

For more information, *write* Baird Machine Co., Stratford, Conn.

GOLD STAR SR

This d-c rectifier type welder does more things better than any other welder of its class because —

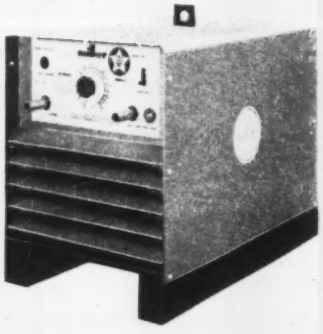
a. Its new transformer (Miller designed and built) has integral flux diverter.
b. Its new weld stabilized circuit delivers the ultimate in speed of metal deposition.
c. Its new completely sealed semi-metallic rectifier — designed for welding — provides the most efficient d-c for welding ever devised.

These features contribute to the Gold Star SR's greater arc stability, denser welds, easy arc starting and flexibility to handle all electrodes in all positions.

Performance-proved wherever profits are important, the Gold Star SR is available in single and duplex models of 200 to 1200 amperes at 60% duty cycle ratings.

miller WELDERS

GOLD STAR
All-Weather
SRH



The features that set the SR above and beyond the normal standards of welder performance belong to the SRH also. But, in addition to the horizontal design for easier stacking and paralleling, this welder has an "all-weather" construction that includes baked varnish coated transformers and rectifiers plus phosphatizing and painting of all base and sheet metal — even fan blades. Cam-Lok receptacles are standard equipment. The Gold Star SRH welds real well.

Complete specifications on these Gold Star models will be sent promptly.

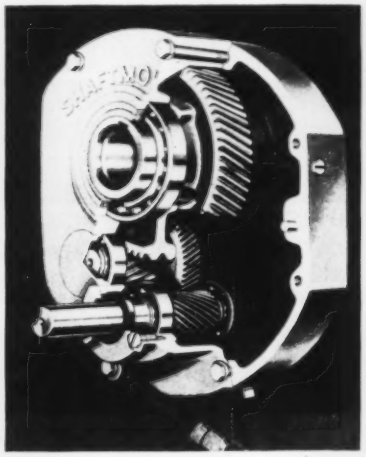
miller ELECTRIC MANUFACTURING COMPANY, INC., APPLETON, WISCONSIN

• Distributed in Canada by Canadian Liquid Air Co., Ltd., Montreal

Shaft Mounted Reducer Offers Two Ratios

THIS SPEED REDUCER features economy, convenience, and efficiency. Sizes from ¼ to 40 hp are available. Speeds range from 5 to 125 rpm.

Two ratios (15:1 or 24:1) make it possible to save money by eliminating high external ratios involving additional belts or sheaves, says the maker.



Variations in mounting positions make the unit (called Shaftmount Syncrogear) versatile and adaptable for limited space applications.

Honing is used to remove minute surface imperfections from the gears. The teeth are profiled to an elliptoidal design. Mesh occurs in the strongest central portion.

For more information, *write* U. S. Electrical Motors Inc., Box 2058, Terminal Annex, Los Angeles 54, Calif.

"Looking for a dependable source for steel rolls? Call National,"

says Bill Mason, Assistant to Manager—Roll Sales.

"When you call, let me tell you about our complete customer service and our expanded facilities for producing steel rolls . . . plain or grooved, in all grades. Many of our facilities are new, from the steel foundry building itself to the melting and heat treating furnaces, and precision machining equipment.

"Also, you can be sure that from the time your order reaches us it will get the individual attention given every roll order at National from careful checking of specifications and skillful manufacture to follow-through in the field by experienced representatives.

"We believe this special attention is reflected in the outstanding performance of National rolls in our customers' stands. You will be pleased with their performance in *your* stands.

"Call National for your steel roll requirements."

GENERAL STEEL CASTINGS

National Roll & Foundry Division

Avonmore (Westmoreland County) Pennsylvania

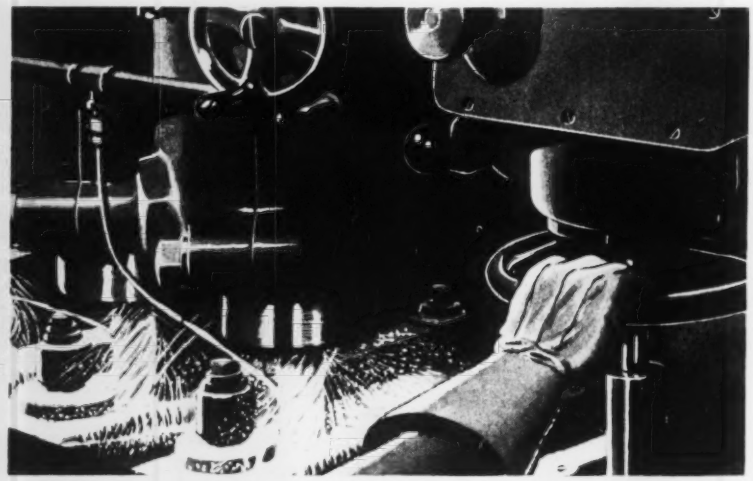
General Steel Castings Corporation: General Offices, Granite City, Ill.

Plants: Granite City, Ill.—Eddystone, Pa.—Avonmore, Pa.

For top economy in oil-water lubricants

ask Oakite

OVER 50 YEARS CLEANING EXPERIENCE • OVER 250 SERVICE MEN • OVER 160 MATERIALS



Oakite Formula 59 cutting solution fights rancidity . . . lasts longer

Most soluble oil cutting solutions are thrown out before they're worn out. When they turn so rancid that operators can't stand the smell, they're replaced. Understandable . . . and wasteful. But using Oakite 59 is far more economical. It *resists* rancidity, lasts far longer—especially in summer, helps protect workers from infection, cuts cost.

How well does it lubricate? Specially formulated from paraffin crude, it forms a stable, uniform emulsion in water for excellent lubrication, good cooling, corrosion protection for work and machine alike.

One of a line of Oakite lubricants for machining and forming, Oakite Formula 59 is a specialized material—as all Oakite products are. Ask the Oakite man about those designed for your operations, your products. And send for Bulletin A-9864. Oakite Products, Inc., 34E Rector Street, New York 6, N. Y.

it PAYS to ask Oakite

OAKITE®

50 1909-1959 SCIENCE

years' leadership in industrial cleaning

NEW Literature

Write directly to the company for a copy

Metal Surface Processing

A 40 page catalog covers machinery and machinery systems for metal cleaning, washing, rinsing, drying and spraying, flow, and dip coating. Ransohoff Co., Hamilton, Ohio.

Milling Performance Chart

A nomograph shows cutting standards for circular milling cutters when applied to various metals and plastics. Morse Twist Drill & Machine Co., New Bedford, Mass.

Thread Rolling Machine

The Lan-Nu-Rol's specifications and capacities and design and operating features are described in Bulletin E-101. Landis Machine Co., Waynesboro, Pa.

How to Beat Vibration

A manual shows how to solve vibration and shock conditions with Sorbtex preformed fabric neoprene and rubber pad materials. Voss Engineering Inc., 5649 N. Ravenswood Ave., Chicago 26, Ill.

Sintered Metal Parts

A four page bulletin treats the process of producing sintered metal parts, their physical characteristics, mechanical properties, economies, and applications. Burgess-Norton Mfg. Co., Geneva, Ill.

NEW BOOKS

Properties of the Rare Earth Metals and Compounds, Rare Earth Research Group, Battelle Memorial Institute, 505 King Ave., Columbus 1, Ohio. 214 pages, $10

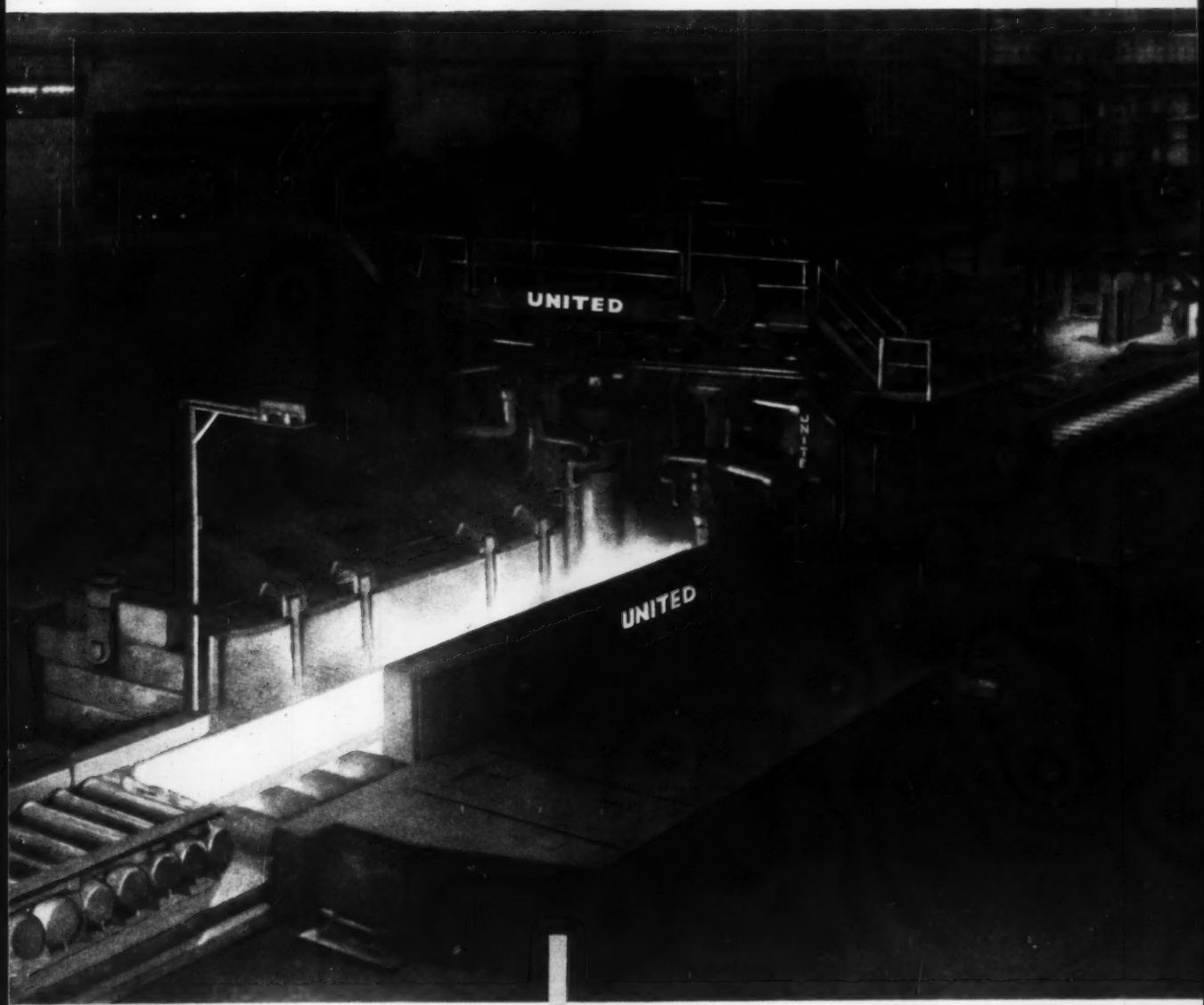
This handbook brings together for the first time data on the physical, crystal, chemical, mechanical, electrical, magnetic, nuclear, and thermodynamic properties of each of the 15 rare earth metals. Data on yttrium, a metal closely associated in nature with the rare earths, are also included. A 114 item reference list of leading sources of information on the rare earths is included.

Creep of Engineering Materials, Iain Finnie. Book Information Service, McGraw-Hill, 327 W. 41st St., New York 36, N. Y. 327 pages, $11.50

Here is comprehensive coverage of the creep of engineering materials, treating design for creep conditions in thorough detail to aid in formulating and solving engineering problems. The book combines the fundamentals of material behavior with important engineering applications, and provides a perspective view of the advantages and limitations of different materials which undergo creep.

UNITED®

46" x 90" SLABBING MILL



UNITED ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

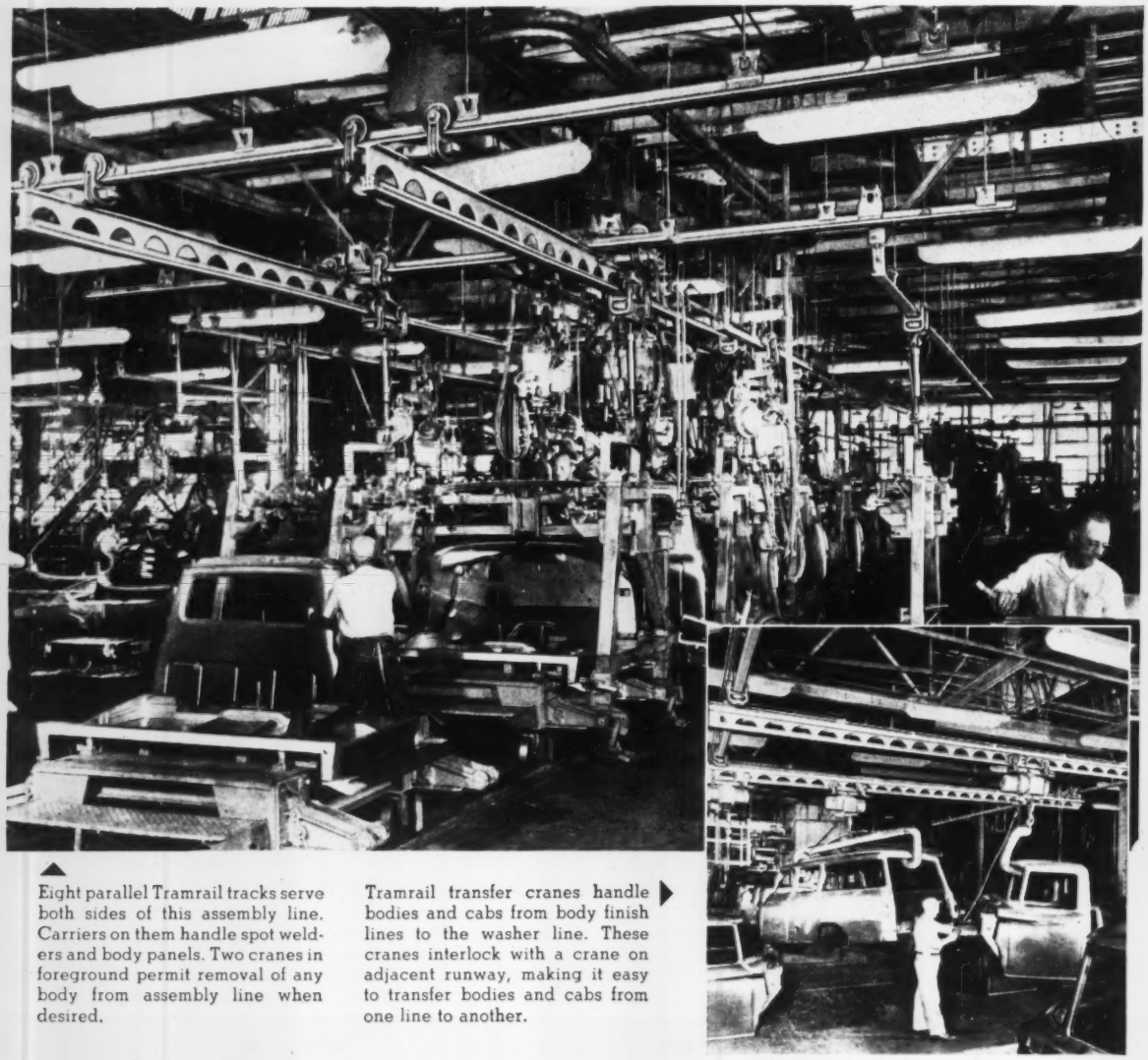
Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington

SUBSIDIARIES: Adamson United Company, Akron, Ohio; Stedman Foundry and Machine Co., Inc., Aurora, Indiana

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

CLEVELAND TRAMRAIL *DEPENDABILITY* FULLY PROVEN BY TRUCK MANUFACTURER

In Continuous Service for Nearly Quarter Century



Eight parallel Tramrail tracks serve both sides of this assembly line. Carriers on them handle spot welders and body panels. Two cranes in foreground permit removal of any body from assembly line when desired.

Tramrail transfer cranes handle bodies and cabs from body finish lines to the washer line. These cranes interlock with a crane on adjacent runway, making it easy to transfer bodies and cabs from one line to another.

IN a truck manufacturing plant every minute counts. Slow-downs or stoppages in any department cannot be tolerated because the operation of each directly affects the others. Here is where the quality of equipment really shows up.

Cleveland Tramrail has been in use for almost a quarter century throughout the large plant of a prominent truck manufacturer for a wide range of materials handling work. It has kept apace with production requirements.

The superior design and exacting standards to which Cleveland Tramrail is built, assures outstanding performance in the manufacture of trucks or other equipment. Cleveland Tramrail equipment can be depended upon.

WRITE FOR FREE COPY of Engineering and Data Booklet No. 2008. Packed with valuable information. Profusely illustrated.

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 7850 E. 290TH • WICKLIFFE, OHIO

September 28, 1959

Anxious Users Scramble for Steel

THE SCRAMBLE is on. Steel consumers are scouring the country for badly needed sheets, plates, bars, and structurals. They're paying premium prices, absorbing extra freight, signing costly conversion contracts—doing whatever is necessary to stay in business. Unless they can find what they're after, they'll have to cut production or shut down.

PRICE NO OBJECT— In Chicago, a hard pressed appliance manufacturer paid $240 a ton for 400 tons of cold rolled sheets, up $100 a ton from prestrike mill prices. A competitor took the conversion route but still paid through the nose. He shipped 200 tons of ingots to a mill for rolling into sheets—a process which added $70 a ton to ingot cost and resulted in heavy scrap losses.

CRISIS IN DETROIT— Automakers are feeling the strike's impact. Lack of steel forced General Motors Corp. to curtail operations at the Columbus, Ohio, plant of its Ternstedt Div. GM will have to close additional trim and hardware units within a few days, but finished part inventories are probably large enough to keep assembly plants running until mid-October. Like Chrysler Corp., GM hopes to alleviate its shortages by purchasing ingots or slabs from a strike free steelmaker and having them shipped to other mills for conversion to sheets. Phoenix Steel Corp. is expected to supply about 70,000 tons of semifinished material. Ford Motor Co. is getting the specialty steel needed in auto production by raiding its Tractor Div.

CUTBACKS FORESEEN— Steel consumers in the Pittsburgh area are telling their suppliers that when their inventories get down to the 21 to 30 day level they'll cut their production schedules by 50 per cent. That will stretch their inventories, permit them to stay in business for as long as 60 days, and postpone costly shutdowns. Most users will probably have to curtail their operations on or about Oct. 1.

SERVICE CENTER STOCKS DROP— Although service center inventories have fallen from 3.7 million to 2.5 million tons since the strike started, they're still large enough to provide nearly all customers with their small order requirements, says the American Steel Warehouse Association. At Pittsburgh, stocks of wide flange beams and heavy plates are nearly exhausted, but the market for light plates is soft. Angles, channels, and I-beams are available in limited sizes and quantities. Sheet supplies are spotty, cold rolled bars abundant. At Detroit and Chicago, galvanized and cold rolled sheets are going fast. Fabricators are loading up on structurals.

IMPORTS TAPERING OFF— With the Great Lakes navigation season nearing an end, few European mills are accepting orders for shipment to lake ports. Reason: They have nothing available for delivery within four weeks, and even if they had, there would be great difficulty obtaining space on freighters. On the East Coast, buyers face long delays (up to four months) and sharply higher prices on sheets, hot rolled bands, and wire products.

OUTPUT UNCHANGED— Last week, steelmaking operations held at 12.5 per cent of capacity. Production was about 354,000 ingot tons.

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*Current prices were published in the Sept. 21 issue and will appear in subsequent issues.

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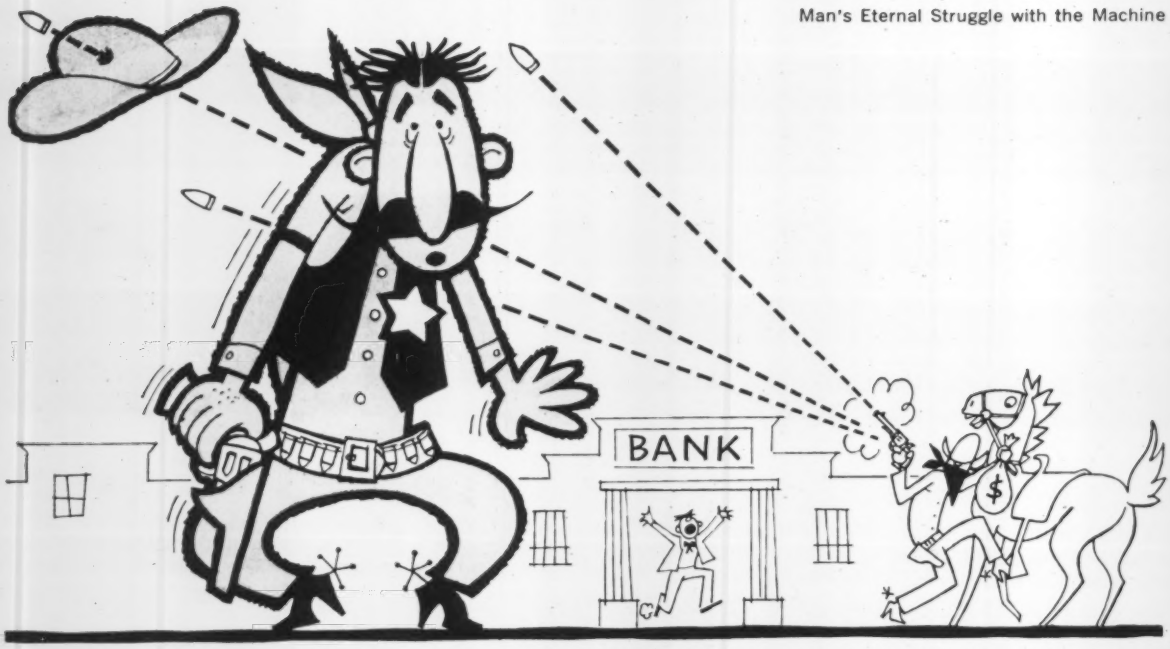
Man's Eternal Struggle with the Machine



COMPETITIVE PRESSURES AND RISING COSTS DEMAND GREATER PRODUCTION EFFICIENCY THAN EVER BEFORE

Have you ever wished you worked in a nice, quiet little shop...?

Sure you have.

The chances are you don't work in one now. There just aren't any nice, quiet little shops anymore. Everybody's out to make a buck. And they all seem to be competitors of yours.

Like everybody else's, your shop is full of complex equipment. Production is rough on the best of it. Eventual breakdown of some sort is almost inevitable. Even though your maintenance people can satisfy most of the problems, what happens when something goes wrong they can't handle?

With your production held up by a breakdown, you can't afford a vendor who passes the buck for service to all the suppliers of his components!

And what about that new equipment you're going to buy? Probably the latest in design. Most likely something your service people don't know anything about at all! Yet, it's got to get into production fast, and stay in as consistently as possible. With your production waiting, you can't afford to test and prove the vendor's machine for him!

Sciaky has always accepted *full responsibility* for its resistance welding and production equipment. Sciaky equipment is designed and built to do the job it was sold to do. That's why it's tested and proved *before shipment*. That's why the Sciaky Service Organization is on call anytime to service Sciaky equipment when necessary.

Why take less than the full advantage of consulting with a Sciaky Application Engineer the next time you're considering equipment. No obligation, of course.

Sciaky Service is a plus-feature that has been wanted by customers all over the world. Why take a chance on service that's sometimes needed on even the best machines. Why, to be sure, when you can enjoy the service facility that has been the difference between expensive production stoppages and minor delays.

SCIAKY

75A

SCIAKY BROS., INC., 4909 W. 67th STREET, CHICAGO 38, ILLINOIS • POrtsmouth 7-5600

Tin Plate Hits Best Canning Pace

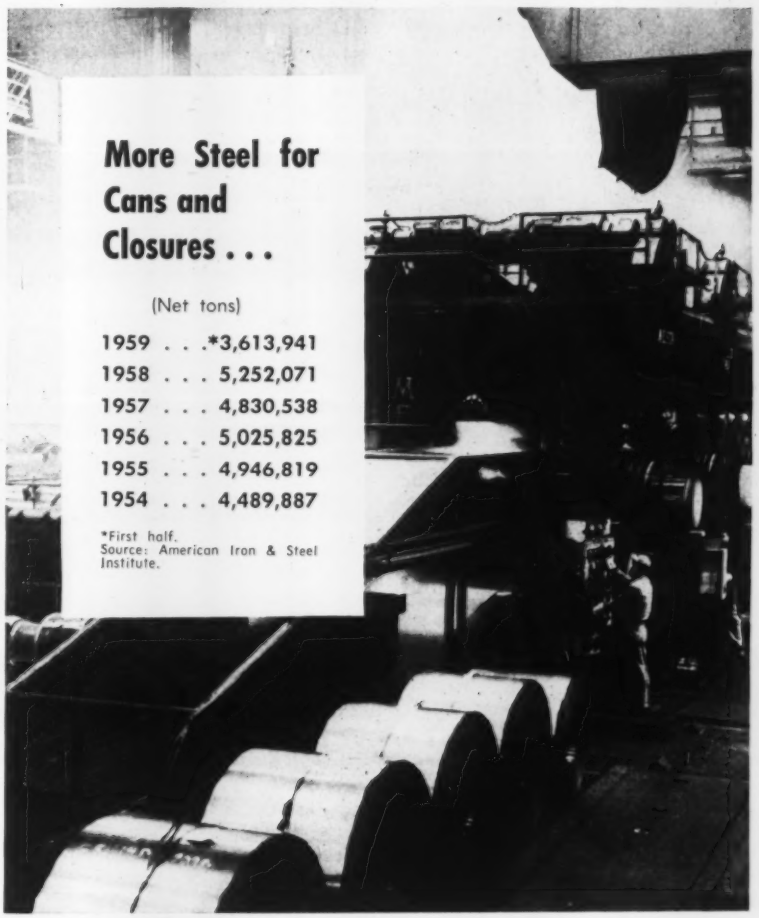
TIN PLATE consumption in the canning industry is on its way to a record this year. Negotiations with the steelworkers' union will be the key. Labor contracts of the two leading manufacturers expire Sept. 30.

In the first half, 3,375,301 tons of terne and tin plate were shipped to canmakers for sanitary and general line cans and closures vs. 4,884,473 tons in all of 1958. Of course, shipments were bolstered by strike hedge buying. But, canmakers have been able to operate without serious handicaps and still have enough steel to carry them into the fourth quarter.

• **Steel Needs Up**—Canning industry needs for black plate and miscellaneous steel products have also been brisk. Last year, the industry took 467,598 tons, pushing its steel usage to a record 5,252,071 tons. In the first half this year, receipts amounted to 446,873 tons—putting steel consumption for the period at 3,613,941 tons. An estimated 300,000 tons were shipped early in July, just before the steel strike began.

Broader markets in canmaking are boosting the industry's steel consumption despite the hefty challenge from aluminum producers. Aluminum canmaking, in the experimental stage only five years ago, is making major strides in beer and petroleum canning. The breakthrough in petroleum came with contracts involving Reynolds Metals Co., Esso Standard Oil Co., National Can Co., and Crown Cork & Seal Co.

• **Aluminum Surge** — Esso used roughly 30 million, quart aluminum cans last year and expects the figure to exceed 50 million this year. An ingenious salvage system is helping to bridge the cost gap between aluminum and steel in the Reynolds-Esso deal. Five other companies have started packaging motor oil in aluminum. Aluminum Co. of America thinks that 175 million oil cans will be used this year—the estimate for all requirements is 200 million aluminum cans.



More Steel for Cans and Closures . . .

(Net tons)

1959 . . .	*3,613,941
1958 . . .	5,252,071
1957 . . .	4,830,538
1956 . . .	5,025,825
1955 . . .	4,946,819
1954 . . .	4,489,887

*First half.
Source: American Iron & Steel Institute.

Cold rolled steel heads for the annealing line for processing into tin plate

Beer is being canned in aluminum in Hawaii and Colorado. A new type container has been developed by Gunther Brewing Co., Baltimore, in co-operation with American Can Co. and Kaiser Aluminum & Chemical Corp. The seamless drawn can is fabricated from rolled aluminum sheets. Impact extrusion is the other method used.

American Can started to make aluminum cans in '58 for packing sardines. They're the first aluminum containers for processed food to be made in commercial quantities in the U. S. Expanding applications are expected in the canning of citrus fruits, berries, cheese, potted meats, and cosmetics.

• **Costs More**—The outlook for aluminum is dampened by metal cost, assembly line handling problems, and relatively slow production. Comparative rates: Drawn, seamless aluminum cans, about 125 a minute; tin cans, 550 a minute.

An Arthur D. Little survey (later confirmed within the industry) reported that aluminum could capture about 5 per cent of the can market (now estimated at 42 billion units) within the next two to five years and possibly 20 per cent within the next ten years.

William C. Stolk, president of American Can, believes: "There are broad potential markets for aluminum cans for certain products

which are sold at retail prices. They can absorb the higher costs of these containers. However, because of the economic and other factors involved, we do not foresee the time when aluminum will generally replace steel in cans for foods and other large volume items."

• **Glass Fights Back**—Makers of glass bottles have been losing ground in some areas of packaging, but they are trying to recapture markets. Example: A lighter-than-standard bottle which is aimed particularly at the packaging of beer, a market in which bottles have suffered substantial setbacks.

Continental Can Co. anticipates a 5 per cent increase in its glass and plastics group this year, with almost half the gain to come in glass. The company observes that flexible packaging (plastics) is "currently the fastest growing segment of the industry."

• **Steel Holds On**—Steel continues to hold its dominant position in the canning market. One large steel producer points out: "The per capita consumption of tin mill products in the container industry (which accounts for over 80 per cent of total tin mill product consumption) has been increasing for many years, partly at the expense of competitive materials. This per capita growth is expected to continue."

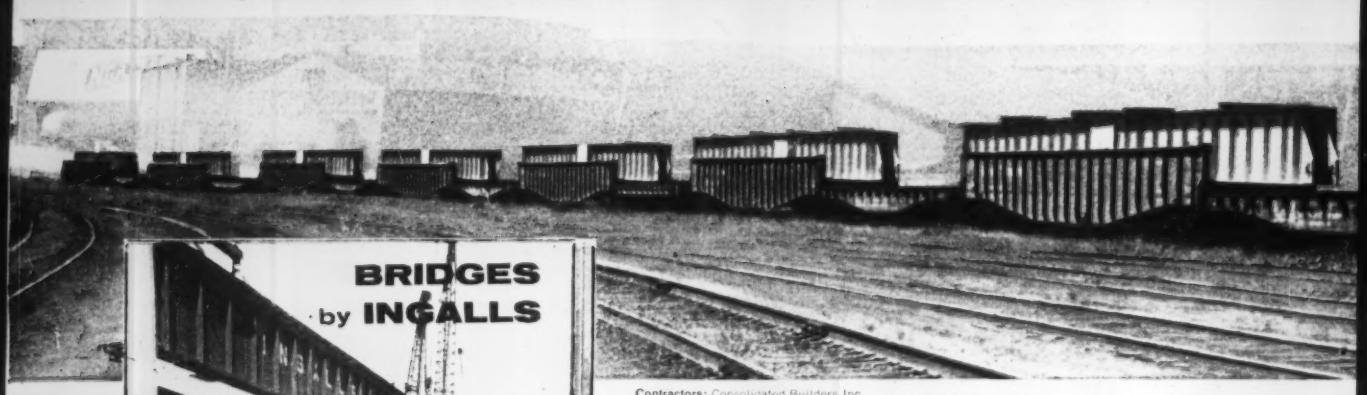
The steel industry's continuing program of product improvement and new product development has resulted in experimental work on chemically treated black plate, which, it is believed, will provide an improved packaging material for a number of products. Lighter gage tin mill products are also under development.

• **Electrolytic Gains**—The trend toward the electrolytic process vs. hot dipping in the production of terne and tin plate continues. Comparative output in the first half: 3,167,068 against 208,233 tons. The electrolytic process offers economies in manufacturing, a reduction in the use of tin, plus better uniformity and quality control. Last year was the sixth consecutive year that electrolytic plate was shipped to the container industry in record quantities.

Steel producers are assisting in the promotion of new uses for tin cans. Last year over 405 million cans were sold for soft drinks, and some steel people look for an increase of at least 10 per cent this year, depending largely on the labor situation.

• **Success in Coils**—Canmakers are contributing much to the expanding use of tin mill products. They produce cans for the packaging of over 2200 different items and are continuing their research with other metals and materials. Perhaps the most important recent development has been the processing of canmaking plate from coils instead of finished sheets. The move, pioneered by American Can, has served to check a trend among canners to make their own cans.

16-CARLOAD "GIRDER EXPRESS"



Contractors: Consolidated Builders Inc.
Engineers: C. A. Maguire & Associates, and Massachusetts Department of Public Works.

Down the line rolled Ingalls' special "Girder Express" . . . on the job, and on time 4 days later . . . after a 1170 mile journey. Destination: Worcester Expressway Bridge, Worcester, Massachusetts.
Cargo: 32 Ingalls' steel fabricated bridge girders – each 93′ 3″ in length.

FREE Write for this new, fully-illustrated brochure featuring bridges by Ingalls.

Other new processes may result from the handling of plate in coil form. It may be possible to enamel plate in a continuous strip and add continuous lithographing. The ultimate step would be to feed the chemically treated, enameled or lithographed plate in coil form, directly into the canmaking equipment without ever shearing it into sheets. Continental Can is also devising ways to use much lighter gage tin plate, to provide economies which would lead to new markets for steel cans.

Steel Bars . . .

Bar Prices, Page 181

Producers of hot rolled bars estimate it will take about three weeks to get back to 80 per cent of capacity operations after the strike. Barring equipment failures, the mills should hit 95 per cent within a month.

Tonnage on books will keep producers running at capacity for three months.

While spot shortages are developing, most consumers are still adequately stocked for the next 30 to 60 days. Fastener manufacturers are showing some concern for their inventories, and they are allocating shipments to customers.

There is little evidence of panic among consumers anywhere.

Automakers and their suppliers are shipping billets to Pittsburgh for conversion to bars and bar size angles. The work is being done on obsolete, high cost mills. Customers include a division of General Motors Corp. and a manufacturer of shock absorbers.

Imported Steel . . .

Imported Steel Prices, Page 187

European steel imports are expected to decline over the next few months. European mills are heavily booked with deliveries well extended. Three or four months is about the best most importers can offer on major merchant products. This combined with continued higher prices, is restricting U. S. demand.

Prices have been advancing on most grades for U. S. shipment. Increases on some items, such as major grades of sheet, hot rolled bands, and wire products, have been sharp. Only structurals appear steady.

Plates . . .

Plate Prices, Page 181

Plate requirements are accumulating, especially in the wider widths and heavier gages—including specialty grades, such as those required by oil and chemical plants. Some new orders can still be placed for shipment this year, assuming prompt resumption of operations at strikebound mills.

Most fabricators are still fairly well stocked. But an increasing number are reporting inventory gaps that are causing some concern.

In the East, demand for wide sheared plate is increasing, inquiries coming to district mills from consumers outside the normal marketing range of local mills.

Delays in completing some projects looms in New England, includ-

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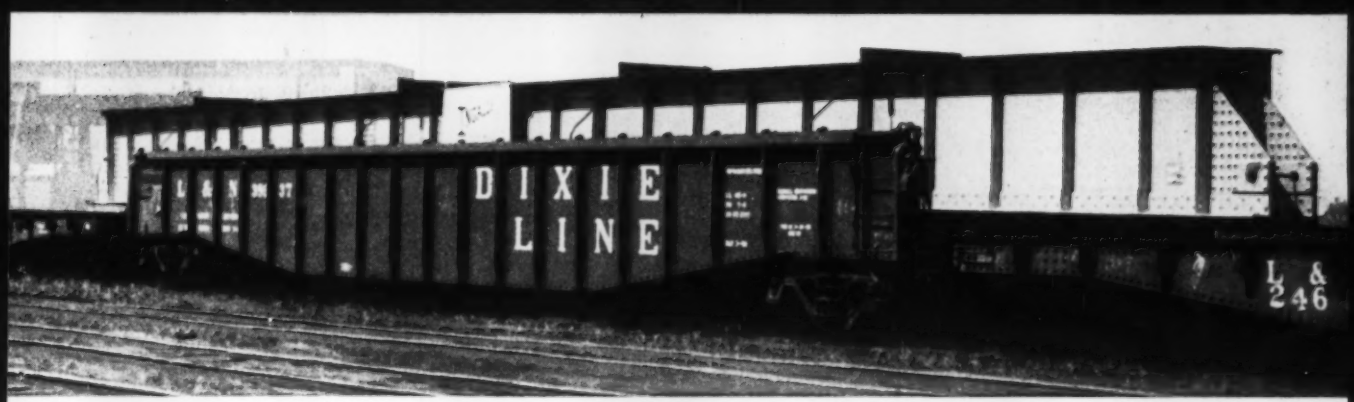

Transportation of the huge girders required 8 heavy-duty flat cars and 8 of the longest gondolas in normal use.

Whether your next job calls for a carload or a trainload of fabricated structural steel . . . you're on the right track for first-class service, express deliveries, and economy rates when you call – Ingalls.

STEEL PLATE FABRICATORS ASSOCIATION FOUNDED 1933

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BIRMINGHAM, ALABAMA

ing an airfield storage tank job and a large diameter pipe project.

General Motors Corp. is reported negotiating for emergency steel supplies with Phoenix Steel Corp., Harrisburg, Pa., a producer not affected by the strike.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 182 & 183

While reports of severe sheet supply shortages among consumers aren't numerous, sheetmakers think many small and medium size users will be in difficulty after Oct. 1. Few customers are pressing the mills to make a quick settlement of the strike as most of them support the steelmakers' anti-inflation position, but observers point out that many buyers are jockeying for position in poststrike delivery schedules.

In general, the sheetmakers are booked about three months ahead. Most are refusing any more tonnage until operations resume. When books are reopened, customers will be sold on an allocation basis. Demand for galvanized and cold rolled sheets will be heaviest.

Granite City Steel Co., Granite City, Ill., is going out of the porcelain enameling sheet business. Company salesmen were notified some time ago to stop taking orders. No more porcelain enameling sheets will be produced after Oct. 1.

Tool Steel . . .

Tool Steel Prices, Page 185

Strikebound tool steel producers are continuing to receive orders. Most of them report they have not lost appreciable tonnage to competitors which have operated during the strike.

However, the executive of one struck plant in the Pittsburgh area comments: "One of the larger tool companies that has been placing the bulk of its orders with us may decide to give part of its business to producers less vulnerable to strikes, if only to keep them abreast of its requirements."

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 182

Inventories of reinforcing bars are shrinking. Fabricators are moving more cautiously in quoting on new projects since their stocks will carry them only a few more weeks in most instances.

Buying is heavy in New England, led by an award of 2000 tons for a vehicular tunnel (in Boston) to Bethlehem Steel Co. Bridge contracts are numerous, the bulk of this tonnage going to one distributor-fabricator, Northern Steel Inc., Boston.

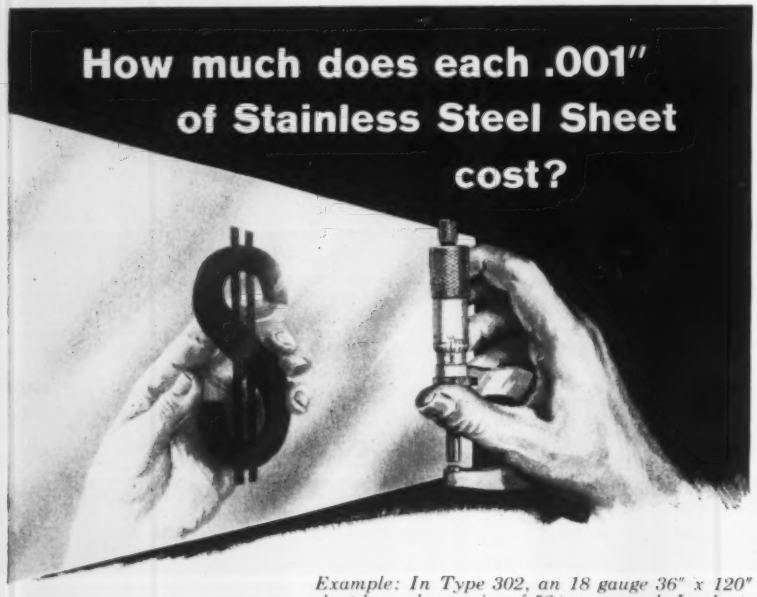
Rails, Cars . . .

Track Material Prices, Page 184

Freight car order backlogs are declining. The American Railway Car Institute and the Association of American Railroads report cars on order and undelivered as of Sept. 1 were 19,656 at railroad shops and 17,516 at commercial shops, a total of 37,172. Comparisons: 40,309 cars on Aug. 1 and 25,611 a year ago.

Freight car orders last month comprised 1753 units vs. 4159 for July. August, 1958, orders totaled 1773.

Deliveries totaled 4890 cars in Au-



Example: In Type 302, an 18 gauge 36" x 120" sheet has a base price of 52¢ per pound. In sheets of this size, each .001" of thickness weighs 1.26 pounds per sheet. Thus, each .001" of unnecessary thickness costs you at least 65.5¢ more per sheet.

On the surface this may seem insignificant, but it has a marked effect on the total price you pay for a given quantity of stainless steel sheet. With cost a factor, this can be important since stainless steel is purchased by weight.

Using the above example, a mere .001" of unnecessary thickness costs you $20.76 more per ton. If you figure the maximum allowable gauge thickness variation of plus or minus (10%), you can readily see that the price you pay for overall sheet thickness could involve much needless cost.

Washington Steel has the equipment and the experience to produce MICRO-ROLD stainless steel to tolerances much closer than standard industry tolerances. Usually money can be saved by first selecting the minimum gauge that will serve the requirements of the application, and then specifying that the thickness be rolled to the light side of the gauge range. This specification involves no cost extra and is standard practice at Washington Steel. (If exact close tolerances must be guaranteed, there is a nominal additional charge.)

Consult your nearest MicroRold Stainless Steel Distributor. He will gladly show you how to save money on your stainless steel purchases.

Washington Steel Corporation

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Washington, Pa.

gust vs. 4273 in July, and 2151 in August a year ago.

Japanese Nail Importers Agree to Change Methods

Ten importing firms operating on the West Coast have agreed in Federal Court, San Francisco, to change their method of distributing Japanese wire nails. The consent decree ended a civil antitrust complaint filed by the U.S. Department of Justice in 1957.

The market for Japanese nails in the West Coast area is estimated at around $2 million annually.

Wire . . .

Wire Prices, Pages 183 & 184

Drawn wire and rod orders for poststrike production are moderately heavier. Rod consumption has been high for nearly three months, and gaps are beginning to appear in consumers' inventories, notably high carbon specialties.

While few consumers have curtailed operations because of wire shortages, many (notably in New England) are reported approaching the point where they'll have to scramble for tonnage.

Tubular Goods . . .

Tubular Goods Prices, Page 185

Expectations are that buttweld pipe will be moving in volume within 30 days after the strike ends, and most deliveries of seamless pipe can be expected within 60 days. Some items will be available in two to three weeks, though producers won't be able to promise firm deliveries until they can appraise their position with respect to backlogs and newly booked orders.

Steel Shortages Cutting Manufacturing Activity

Severe steel shortages among Midwestern consumers are few, but spot shortages are on the increase. Some users feel secure well into November. Others think they may run into trouble anywhere from Oct. 1 to Oct. 31.

Makers of finished products are meeting increasing difficulty in obtaining adequate supplies of components.

Distributors . . .

Prices, Page 186

Steel service centers are being deluged with inquiries for material, especially light flat rolled products. Demand consists of more and larger orders, including an increasing volume from plants outside normal trading areas. A large portion is being rejected since the distributors are conserving inventories as much as possible for their regular customers.

Most distributors are pretty well cleaned out of some products like galvanized sheets and cold rolled sheets.

Although stocks of wide flange beams and heavy plates are nearly exhausted in the Pittsburgh district, the market for light plates (3/16 in. to ½ in.) is soft. Angles, channels, and I-beams are still available, but quantities and sizes are limited.

To supplement his inventory, one Pittsburgh distributor bought $50,000 worth of 28 to 30 gage galvanized material from a fabricator's

WAPAK SLITTERS

Photo courtesy of Stamco Inc., New Bremen, Ohio

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Export Div.: 30 Church St. New York 7, New York

Longer continuous runs with less down-time are obtained with WAPAK Slitters and Rotary Shear Knives, because they're designed for high-speed cutting and trimming. Precision inspected by visual gage and profilometer.

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Use WAPAK MULTICUT for maximum production. WAPAK TUFCUT is engineered for shock-resistant cutting of heavy stock.

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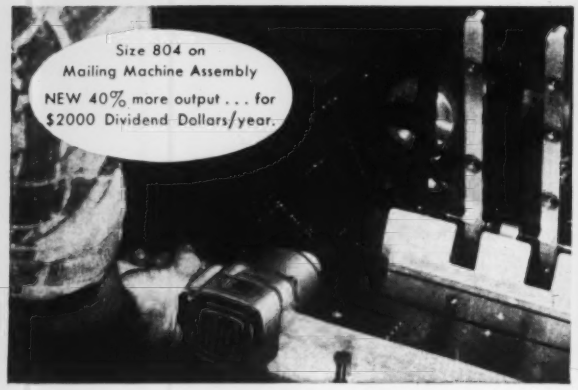

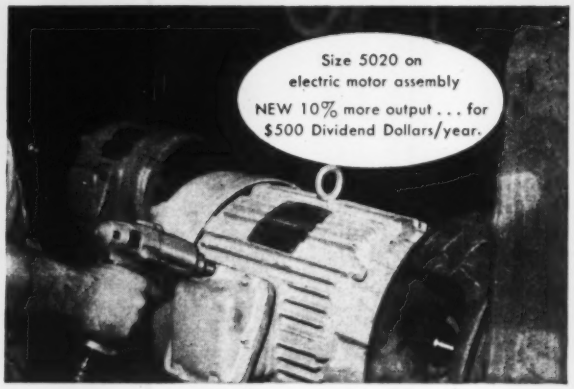

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surplus. "We made enough on the quantity extras to sell the material to our customers at regular service center prices," he says.

There is little evidence of a gray market, but a broker reportedly offered an automaker 18 gage hot rolled sheets at 20.00c a pound—almost two and one-half times the service center price. The offer was rejected, STEEL was told.

Structural Shapes . . .

Structural Shape Prices, Page 181

Structural steel market activity in the East is featured by the placing of 10,000 tons for the Smithsonian Institution, Washington, D. C., and 3250 tons for highway work near Baltimore.

In New England, a substantial volume of tonnage is on order for replacement of broken and depleted inventories, but it will not be shipped until the first quarter of next year. More tonnage is being estimated in the district, fully 80 per cent of it bridges.

Illinois is holding up a number of construction jobs but not because of the steel strike. Some time ago, Governor Stratton put a freeze order on $80 million worth of public construction because the 1959 General Assembly appropriated sums for construction exceeding budget recommendations. The freeze was to be in effect until Jan. 1, 1960.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

10,000 tons, addition, Smithsonian Institution, Washington, D. C., through Norair Engineering Co., Washington, general contractor, to the American Bridge Div., U. S. Steel Corp., Pittsburgh.

5000 tons, trashracks, cranes, gates, and other appurtenances, for Wanapum Dam, Columbia River, to Yuba Mfg. Co., Benecia, Calif., by Grant County Constructors, a joint venture for Grant County P.U.D., Ephrata, Wash.

3250 tons, section IC, Jones Falls Expressway, Baltimore, through Richard Nissley, Landisville, Pa., general contractor, to Harris Structural Steel Co., New York.

1500 tons, trashracks, guides, and miscellaneous, Wanapum Dam, near Ephrata, Wash., to Pacific Car & Foundry Co., Seattle.

940 tons, five composite rolled beam bridges, Lebanon-Bozrah-Norwich, Conn., to City Iron Works, Wethersfield, Conn., through Angelo Tomasso Inc., general contractor.

700 tons, Bomarc facilities, AFB, Duluth, Minn., to International Steel Co., Evansville, Ind.; Blount Bros. Construction Co., Montgomery, Ala., general contractor.

300 tons, four special type Minutemen program towers for Boeing Airplane Co. to Consolidated Western Steel Corp., Seattle.

STRUCTURAL STEEL PENDING

2025 tons, steel piles, also 275 tons, sheet piling, substructure, Merrimack River Bridge, Lawrence, Mass., J. F. White Contracting Co., Westwood, Mass., low on the general contract.

2000 tons, helix housing structures, Navy installation, Cutler, Maine; Consolidated Constructors Inc., Portland, Maine, low on the general contract.

865 tons, state bridgework, FASH 59-13, Suffolk County, New York, Hendrickson Bros., low on general contract.

800 tons, section, lower level construction, George Washington Bridge, involving approach roadway on New Jersey side, joint bid to Rusciano Construction Corp. and Del Balso Construction Corp., approved by Port of New York Authority.

731 tons, state bridgework, FISH 59-1, Oswego County, New York, Johnson, Drake & Piper, Buffalo, low on general contract.

620 tons, two four-span composite wide flange beam bridges, contract No. 2, Putney, Vt.; Perini Corp., Framingham, Mass., low on the general contract; also, 190 tons of reinforcing bars, and 4680 linear ft of steel piling.

525 tons, three 3 span and one, 4 span wide flange beam bridges, Putney, Vt., contract 1; Lane Construction Co., Meriden, Conn., low on the general contract; also, 335 tons of reinforcing bars and 350 tons of steel piles.

500 tons, high school gymnasium and auditorium, Riverhead, N. Y., bids Oct. 10.

325 tons, addition, St. Francis Hospital, Wilmington, Del.; bids asked.

230 tons, state highway bridge, Falmouth, Maine; bids Oct. 7, Augusta, Maine.

225 tons, state bridgework, FARC 59-110, Rensalaer and Saratoga Counties, New York, Arthur Donavon, low on general contract.

194 tons, state bridgework, FASH 59-20, Ulster County, New York, Seacraft Construction Co., Troy, N. Y., low on general contract.

157 tons, including piling, state highway bridge, Stonington, Conn.; Macari Bros., Windsor, Conn., low on the general contract.

135 tons, state highway bridge, Stockton Springs, Maine; bids Sept. 30, Augusta, Maine.

100 tons, Dravus St. traffic viaduct, Seattle; Scheumann & Johnson, Seattle, low bidder at $1,363,267.

REINFORCING BARS . . .

REINFORCING BARS PLACED

3800 tons, missile projects in Spokane, Wash., area to Northwest Steel Rolling Mills Inc., Seattle; Blaw-Knox Co., Pittsburgh, general contractor.

2000 tons, additional twin tube, vehicular tunnel, Boston-East Boston, to Bethlehem Steel Co., Bethlehem, Pa.; Perini Corp., Framingham, Mass., general contractor; also 300 tons of bolts to Commercial Shearing & Stamping Co., Youngstown; 1566 tons, tunnel rings also to Commercial Shearing & Stamping.

1700 tons, elevated structure, Baton Rouge, La., to Southern Industries Sales Inc., New Orleans; Philip R. Farnsworth & Co. Inc., New Orleans, general contractor.

1350 tons, addition, Memorial Hospital, Charlotte, N. C., to Truscon Steel Div., Republic Steel Corp., Charlotte; Little Construction Co., Charlotte, general contractor.

650 tons, municipal sewer and water department, Philadelphia, through J. Lombardi, Philadelphia, general contractor, to Bethlehem Steel Co., Bethlehem, Pa.

600 tons, Minuteman facilities, state 31 and 32, Patrick AFB, Florida, to Virginia Steel Co., Richmond, Va., through George A. Fuller Co., Atlanta, general contractor.

568 tons, DeKalb County Hospital, Decatur, Ga., to Southern General Fireproof Co., Atlanta; T. C. Brittain Co., Decatur, general contractor; structural steel to Breman Steel Co., Atlanta.

500 tons, reinforcing bars and structurals, medical building, Dartmouth College, Hanover, N. H., to Bethlehem Steel Co., (reinforcing bars) and American Architectural Iron Co., Boston (structurals); Wexler Construction Co., Newton Highlands, Mass., general contractor.

485 tons, six highway structures and pavement, Danbury, Conn., to U. S. Steel Supply Div., U. S. Steel Corp., Pittsburgh; L. G. DeFelice & Son Inc., North Haven, Conn., general contractor; 375 tons of highway mat reinforcement to American Steel & Wire Div., U. S. Steel Corp., Pittsburgh.

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425 tons, fairway project, Pierce County, Wash., to unstated interest; general contract to Cherf Bros., Ephrata, Wash.

400 tons, Bomarc facilities, AFB, Duluth, Minn., to St. Paul Foundry & Mfg. Co., St. Paul, Minn.; Blount Bros. Construction Co., Montgomery, Ala., general contractor.

300 tons, junior high school, Wakefield, Mass., to Northern Steel Inc., Boston; M. S. Kelliher Co., Boston, general contractor.

300 tons, Bomarc project, Adair, Oreg., to unstated interest; Donald M. Drake Co., Portland, Oreg., general contractor.

300 tons, plant addition, Foote Mineral Co., Knoxville, Tenn., to Calloway Building Products Co., Knoxville; Foster & Creighton Co., Nashville, Tenn., general contractor; structural steel contract to Tucker Steel Co., by owner.

285 tons, electrical engineering building, Georgia School of Technology, Atlanta, to Tech Steel Co., Atlanta; Abco Builders Co. Inc., Atlanta, general contractor.

250 tons, outfall sewer, Metropolitan District Commission, Deer Island, Boston, to Bethlehem Steel Co., Bethlehem, Pa.; Zoppo Co. Inc., Norwood, Mass., general contractor.

260 tons, warehouse, Magee Carpet Co., Bloomsburg, Pa., through S. H. Everet, general contractor, to Sweets Steel Co., Williamsport, Pa.

172 tons, military installation, Ft. Greeley, Alaska, to Pacific Coast Div., Bethlehem Steel Co., Seattle.

125 tons, hospital, Wurtsmith AFB, Oscoda, Mich., to Ceco Steel Products Corp., Chicago; Beacon Construction Co., Boston, general contractor; 92 tons, structural steel, to Acorn Iron Works.

110 tons, guided missile maintenance shop, Pueblo, Colo., to Colorado Builders' Supply Co., Denver; C. H. Leavell & Co., El Paso, Tex., general contractor.

100 tons, school, Our Lady of Peace, Delaware County, Pennsylvania, through Joseph Farrell, to Sweets Steel Co., Williamsport, Pa.

Unstated, sewage plant, Upper Merion Township, Pennsylvania, to Sweets Steel Co., Williamsport, Pa.

Unstated, satellite station, Ft. Greeley, Alaska, to Joseph T. Ryerson & Son Inc., Seattle; Chris Berg Inc., Seattle, general contractor.

REINFORCING BARS PENDING

14,000 tons, north shore lock and dam, John Day Dam, Columbia River; bids to U. S. Engineer, Walla Walla, Wash., Nov. 19.

3800 tons, missile project, Spokane, Wash. area; Blaw-Knox Corp., Pittsburgh, low on general contract to the U. S. Engineer.

550 tons, Dravus St. traffic viaduct, Seattle; bids in.

450 tons, school, Philadelphia, McCloskey & Co., Philadelphia, low on the general contract.

100 tons, road project, Lane County, Oreg.; bids to the U. S. Forest Service, Portland, Oreg., Oct. 12.

100 tons or more, 11 underground structures; microwave facilities, Fairchild Air Base, Washington State; bids to U. S. Engineer, Seattle, Oct. 8.

100 tons or more, Oregon State highway projects, low bids: Multnomah County, two partial viaducts, 650 and 620 ft, Hannan Bros., Portland, Oreg., low at $381,705; Union County, 462 ft dual structures, S. & D. Construction Co., Portland, Oreg., low at $422,095.

100 tons or more, Fulmer Chemistry Hall, Washington State College, Pullman, Wash.; Purvis Construction Co., Yardley, Wash., has general award at $846,706.

51 tons, Pacific Coast Div., Bethlehem Steel Co., Seattle; general contract to John H. Sellen Contruction Co., Seattle.

50 tons or more, three county bridges; bids to Yakima, Wash., Oct. 1.

Unstated, Seahurst Junior High School, Seattle; general contract to Lease Co. Inc., Seattle, low at $583,150.

Unstated, 7-story apartment, Ninth and James Streets, Seattle; George Bolotin, architect.

PLATES . . .

PLATES PLACED

750 tons, 16 fuel tanks, O'Hare International Airport, for City of Chicago, to Chicago Bridge & Iron Co., Chicago.

290 tons, water tank, District No. 75, Seattle, to Pittsburgh-Des Moines Steel Co., Seattle.

180 tons, 123 ft diameter, dome shaped containment structure for atomic reactor at municipal nuclear powerplant, Piqua, Ohio, to Graver Tank & Mfg. Co., East Chicago, Ind.; Atomics International, division of North America Aviation Inc., Canoga Park, Calif., contractor.

150 tons, storage tanks, Olympia Brewing Co., Olympia, Wash., to Puget Sound Fabricators Inc., Seattle.

150 tons, 90 ft storage tank for Shell Oil Co., Shemya Island, Alaska, to Puget Sound Fabricators Inc., Seattle.

100 tons or more, storage tank, Bomarc missile project, Paine Air Field, Washington State, to W. E. Caldwell Co., Louisville; Sellen Construction Co., Seattle, general contractor.

100 tons or more, storage tank, Bomarc missile project, Adair Air Field, Oregon, to unstated interest.

PLATES PENDING

1000 tons, large diameter steel pipe, mostly 60 in., waterlines from shaft 9A, Medford-Malden, Mass., Metropolitan District Commission; Construction Service Co., Bound Brook, N. J., low on the general contract.

1000 tons, water storage tanks, Industrial Water Board, Birmingham, Hammond Iron Works, Birmingham, low.

200 tons or more, 6 million gal elevated tank and standpipe; bids to Portland, Oreg., Sept. 30.

150 tons, also reinforcing, penstock, Blue Lake powerhouse, for Sitka, Alaska; Morrison-Knudsen Co. Inc., Seattle, low at $1,770,774; Carey & Kramer, Seattle, engineers.

120 tons, alloy, General Stores Supply Office, Navy, Philadelphia; bids Oct. 1; also, 78 tons of stainless sheets, bids Sept. 22.

100 tons or more, two steel penstocks, 734 ft by 36 in., Ketchikan, Alaska; Builders Inc., Ketchikan, low bidder at $38,995.

Unstated, three bridges, Portage Glacier Highway, Alaska, involving 3000 ft steel piles; United General Constructors, Seattle, low at $173,367 to the Bureau of Public Roads, Juneau, Alaska.

PIPE . . .

CAST IRON PIPE PLACED

2000 tons, 6 to 12 in., for Spokane, Wash., to Pacific States Cast Iron Pipe Co., Portland, Oreg.

1172 tons, 6 to 16 in., 35th Ave., northeast, Seattle, project, to U. S. Pipe & Foundry Co., Seattle.

388 tons, 8 and 16 in. for Renton, Wash., to Pacific States Cast Iron Pipe Co., Seattle.

500 tons, 6 to 16 in., for Goose Lake Project, Anchorage, Alaska, to U. S. Pipe & Foundry Co., Seattle.

425 tons, District No. 38, King County, Wash., to U. S. Pipe & Foundry Co., Seattle.

304 tons, 6 to 16 in., King County District No. 28, Seattle, to the U. S. Pipe & Foundry Co., Seattle.

233 tons, miscellaneous, Seattle and Port Orchard, Wash., to U. S. Pipe & Foundry Co., Seattle.

172 tons, various sizes, Tacoma, Toppenish, District No. 38, King County, Wash., and Rainier National Park, Wash., to Pacific States Cast Iron Pipe Co., Seattle.

CAST IRON PIPE PENDING

200 tons or more, 60,000 ft of 4 to 8 in.; bids to King County District No. 75, Seattle, Sept. 29.

189 tons, 6 to 16 in., Tacoma system improvement; bids in.

Unstated, 6 to 16 in., for Tacoma, Wash.; bids opened Sept. 14.

RAILS, CARS . . .

LOCOMOTIVES PLACED

United Arab Republic, 58 diesel locomotives to General Motors Overseas Corp.; units will be built by GM's Electro-Motive Div. at La Grange, Ill.

RAILROAD CARS PLACED

Northern Pacific, twenty-five 85-ft piggyback flatcars, to General American Transportation Corp., Chicago.

New York City Transit Authority, 230 subway cars, to St. Louis Car Co., St. Louis.

Baltimore & Ohio, equipping 100 boxcars with aluminum interior linings, 50 sets going to Aluminum Co. of America, Pittsburgh, and 50 to Reynolds Metals Co., Richmond, Va.

DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Sept. 27	Change	Same Week 1958	Same Week 1957
Pittsburgh	2.5	+ 0.5	61	83.5
Chicago	5.5	0	78.5	86
Eastern	10	0	66	86
Youngstown	9	0	54	77
Wheeling	51.5	+ 3.5	73.5	94
Cleveland	6	0	68	85.5
Buffalo	4	0	58.5	100
Birmingham	9	0	54	72.5
Cincinnati	69	— 0.5*	76.5	79
St. Louis	65.5	+ 2*	78.5	77
Detroit	23.5	— 1	69.5	94.5
Western	6	0	75	94
National Rate	12.5	— 0.1*	66.5	82

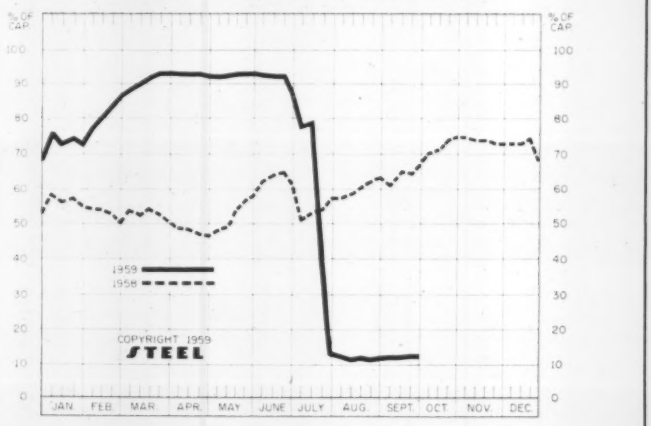
INGOT PRODUCTION

	Week Ended Sept. 27	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	22.0†	22.0	20.7	113.0
NET TONS (In thousands)	354†	356	332	1,816

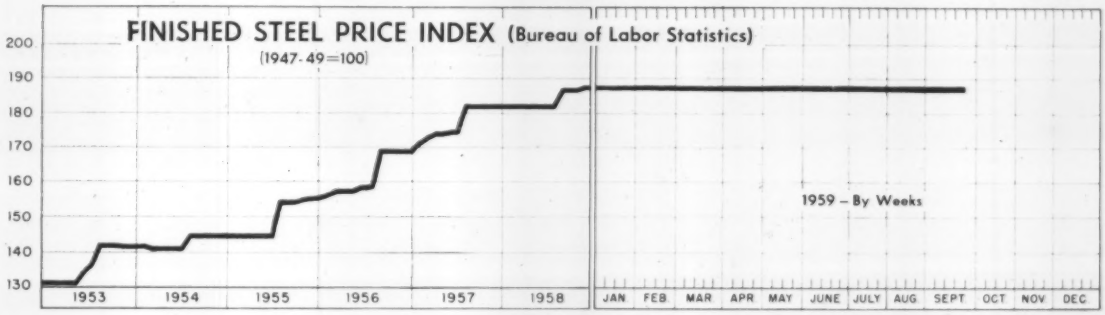
*Change from preceding week's revised rate.
†Estimated by STEEL; comparative figures reported by AISI.

Weekly capacity (net tons): 2,831,331 in 1959; 2,699,173 in 1958; 2,559,490 in 1957.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Sept. 22, 1959	Week Ago	Month Ago	Aug. Index	Year Ago
186.7	186.7	186.7	186.7	186.6

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Sept. 22

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 in. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Bars, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.543
Bars, H.R., Carbon	6.675
Bars, Reinforcing	6.385
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars, C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets, C.R., Carbon	7.300
Sheets, Galvanized	8.615
Sheets, C.R., Stainless, 302 (lb)	0.658
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.489
Strip, C.R., Stainless, 430 (lb)	0.480
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.905
Pipe, Galv., Buttweld (100 ft)	23.253
Pipe, Line (100 ft)	199.533
Casing, Oil Well, Carbon (100 ft)	201.080
Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200
Tubing, Mechanical, Carbon (100 ft)	27.005
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon	10.575
Wire, Drawn, Stainless, 430 (lb)	0.665
Bale Ties (bundles)	7.967
Nails, Wire, 8d Common	9.825
Wire, Barbed (80-rod spool)	8.722
Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	Sept. 23 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	246.65	194.19
Index in cents per lb	6.713	6.713	6.713	6.682	5.261

STEEL's ARITHMETICAL COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.28	$117.77
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	41.00	41.00	38.33	43.00	29.75

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Sept. 23 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.30
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.30
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.55
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.40
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.25
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.25
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.77	4.53
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.225
Plates, Chicago	5.30	5.30	5.30	5.30	4.225
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.225
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.225
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.225
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.10
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.45
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	5.75
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.00
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	5.60-5.90
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	5.75
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.85
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.30	$8.95

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$78.00
Wire rods, $\frac{7}{16}$-$\frac{47}{64}$" Pitts.	6.40	6.40	6.40	6.40	4.675

PIG IRON, Gross Ton	Sept. 23 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	49.66
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	50.16
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry (Birm.) deld., Cin.	70.20	70.20	70.20	70.20	60.43
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	190.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$41.50	$41.50	$38.50	$43.50	$30.50
No. 1 Heavy Melt, E. Pa.	41.00	41.00	40.00	40.00	28.75
No. 1 Heavy Melt, Chicago	40.50	40.50	36.50	45.50	30.00
No. 1 Heavy Melt, Valley	43.50	41.50	41.50	43.50	32.50
No. 1 Heavy Melt, Cleve.	39.50	38.50	38.50	40.00	30.50
No. 1 Heavy Melt, Buffalo	33.50	33.50	33.50	34.50	28.50
Rails, Rerolling, Chicago	62.50	62.50	61.50	65.50	47.50
No. 1 Cast, Chicago	55.50	55.50	53.50	46.50	35.50

COKE, Net Ton					
Beehive, Furn., Connisvl.	$15.00	$15.00	$15.00	$15.25	$14.75
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	30.50	25.25

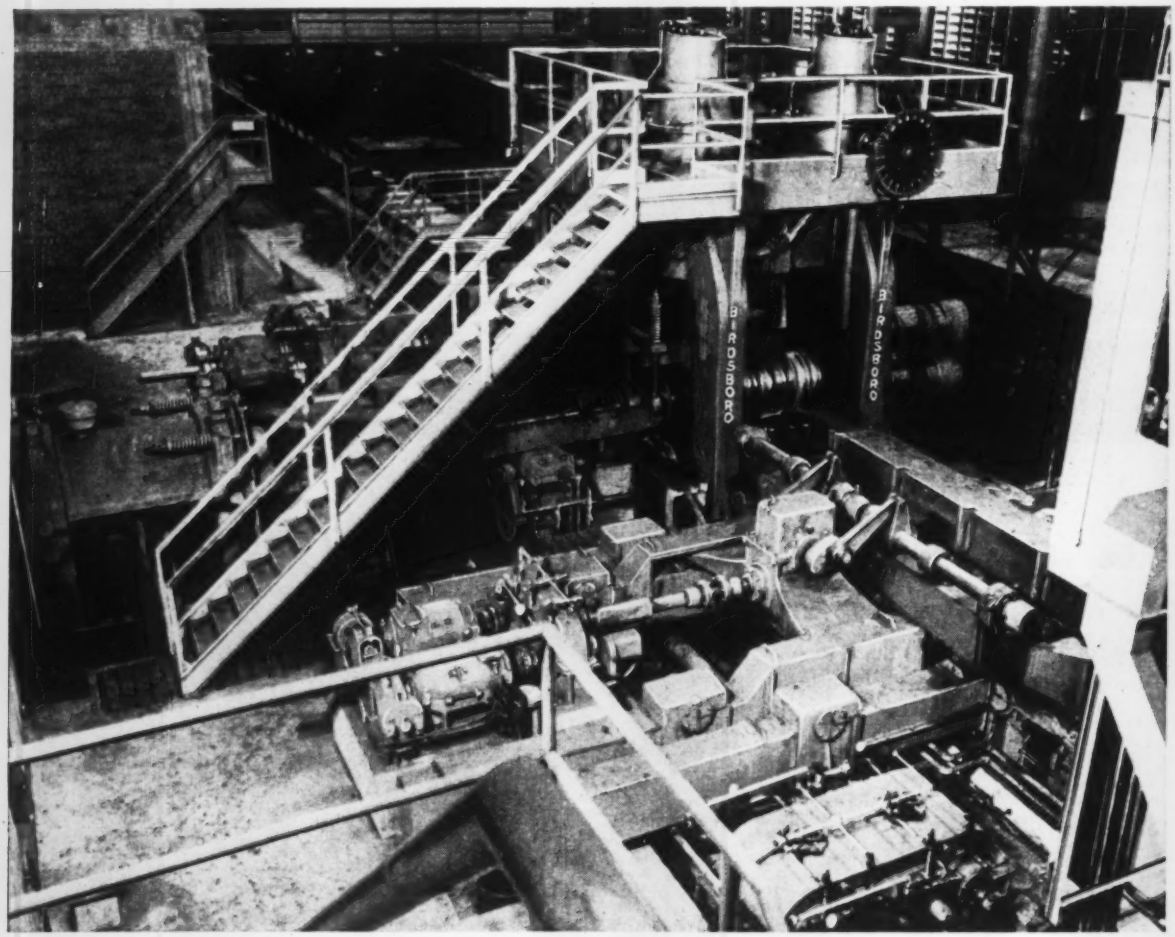
In Utah, **U. S. Steel's** *production horse (32" blooming mill) carries the famous* **BIRDSBORO** *brand*

In the New West, work horses are still being branded. Nowadays, the brand is no longer used to prevent rustling, but as a hallmark of pride.

In U.S. Steel's Geneva Works out in Utah, the BIRDSBORO brand rides high on the 32" blooming mill. Key installations throughout the world carry this name. It has come to represent more than machines, but ideas, too . . . ideas that have frequently helped pioneers of both East and West to advance the steel industry and its products ever forward.

Whether it be a single unit of equipment or a complete mill installation, BIRDSBORO's customized engineering can be a valuable tool in your expansion and modernization.

Ask for details of some of our recent projects that might have application in your plant, or call in the BIRDSBORO engineers for their appraisal of your own pioneering venture. *Sales Department, Engineering Department and Mfg. Plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa.



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BIRDSBORO

STEEL FOUNDRY AND MACHINE CO.

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • Weldments "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel

Steel Prices

Mill prices as reported to STEEL, Sept. 23, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point incates producing company. Key to producers, page 182; footnotes, page 184.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$76.00

INGOTS, Alloy (NT)
Detroit S41 .....$82.00
Economy,Pa. B14 .....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bartonville,Ill. K4 ..$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 .....80.00
Fontana,Calif. K1 .....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 .....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall Pa. U5 .....80.00
Owensboro,Ky. G8 .....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ..80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3..104.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 .....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 .....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 .....99.50
Lackawanna,N.Y. B2..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14..99.50
S.Duquesne,Pa. U5 ...99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3..126.00
Detroit S41 .....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ..119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 .....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ....119.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14..119.00
S.Duquesne,Pa. U5 ...119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5 ...122.50
Warren,O. C17 .....122.50

SKELP
Aliquippa,Pa. J5 .....5.05
Munhall,Pa. U5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1..6.40
Johnstown,Pa. B2 .....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 .....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 .....6.40
Roebling,N.J. R5 .....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 .....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 .....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 .....6.25
Seattle B3 .....6.25
S.Chicago,Ill. U5 W14..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 .....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N15 .....5.50
Weirton,W.Va. W16 ....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 .....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 .....8.75
Munhall Pa. U5 .....8.05
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange
Beth'lehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ...5.30
Atlanta A11 .....5.50
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. C22 .....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 .....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 .....5.40
Harrisburg,Pa. P4 .....5.30
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1 5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B3 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 .....5.30
Youngstown(27) R2 .....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 .....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 .....13.55

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton Pa. U5 .....7.95
Claymont,Del. C22 .....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ..7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1..7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Warren,O. R2 .....7.95
Youngstown U5, Y1 .....7.95

PLATES, Alloy
Aliquippa,Pa. J5 .....7.50
Claymont,Del. C22 .....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 .....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 .....7.50

FLOOR PLATES
Cleveland J5 .....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ..6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ..5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R2 .....6.05
Warren,O. c.l. R2 .....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.675
Aliquippa,Pa.(9) J5 ..5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ..5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ..5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ..5.675
Emeryville,Calif. J7 ..6.425
Fairfield,Ala.(9) T2 ..5.675
Fairless,Pa.(9) U5 ...5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ...5.675
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ...6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Owensboro,Ky.(9) G8 ..6.025
Pittsburg Calif.(9) C11..6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 .....6.425
Riverdale,Ill.(9) A1 ..5.675
Seattle A24, B3, N14 ..6.425
S.Ch'e'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ...5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11..6.375
Warren,O. C17 .....6.025
Youngstown(9) R2, U5..5.675

Bars, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.725
Bethlehem Pa. B2 .....6.725
Bridgeport,Conn. C32 ..6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 .....6.725
Clairton,Pa. U5 .....6.725
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Fairless,Pa. U5 .....6.875
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 .....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1..6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 .....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 .....6.725
Pittsburgh J5 .....6.725
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14..6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem Pa. B2 .....8.30
Clairton Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor Ind. Y1 ....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 .....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9)S5 ..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ....5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland Oreg. O4 ....6.425
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.06
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Leaded
(Including leaded extra)
Carbon
LosAngeles P2, S30 ..11.75*

Alloy
Ambridge,Pa. W18 ...10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J P13 .....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.05c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 .....7.65
BeaverFalls,Pa. M12,R2..7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 .....7.65
Detroit B5, P17 .....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ..7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2 ..7.65
Hartford,Conn. R2 .....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2 9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ...7.65
Midland,Pa. C18 .....7.65
Monaca Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 .....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 .....7.65
SpringCity,Pa. K3 .....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ..8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon
(Turned and Ground)
Cumberland,Md.(5) C19..6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 .....9.025
BeaverFalls,Pa.M12,R2 9.025
Bethlehem Pa. B2 .....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 .....9.025
Detroit B5, P17 .....9.225
Detroit S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025
Hammond,Ind. J5, L2 ..9.025
Hartford,Conn. R2 .....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B2..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ....9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 .....9.225
S.Chicago,Ill. W14 .....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 .....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ....9.325
Youngstown F3, Y1 ....9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex(4)(26)T4 5.925
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2, Y1 5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.925
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. R2, W14 5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 .....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill. (1) N15 ...5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10
Torrance,Calif. C11 ..6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.60
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ..7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt.,Md. B2 ..7.33
St. Paul U8 .....8.17
Williamsport,Pa. S19 ..7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.90
Economy,Pa.(D.R.)B14 18.55
Economy(Staybolt)B14 19.00
McK.Rks. (S.R.) L5 ..14.50
McK.Rks.(D.R.) L5 ..19.80
McK.Rks.(Staybolt)L5 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2 5.575
ChicagoHts.(4) (44) I-2 5.675
ChicagoHts. (4) C2 ....5.675
Franklin,Pa. (3) F5 ..5.575
Franklin,Pa. (4) F5 ..5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ..5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit (8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1 5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R., Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14 7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ..7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 ....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2.6.275
Steubenville,O. W10 ..6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10.....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(37) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(38) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	Cu Steel	Cu Fee
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	7.75
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2 .6.875‡
Ashland Ky. A10 ....6.875†
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10 6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ...7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Wall Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) B2 .....7.65
Niles,O. (28) R2 .....7.65
Weirton,W.Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
GraniteCity,Ill. G4 ....6.875
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Follansbee,W.Va. F4 ..8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel ofN.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas & Fuel Assoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring Corp.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala. City, Ala. (27) R2 ...5.10
Allenport, Pa. P7 .....5.10
Alton, Ill. L1 .....5.30
Ashland, Ky. (8) A10 ...5.10
Atlanta A11 .....5.10
Bessemer, Ala. T2 .....5.10
Birmingham C15 .....5.10
Buffalo (27) R2 .....5.10
Conshohocken, Pa. A3 ..5.15
Detroit M1 .....5.10
Ecorse, Mich. G5 .....5.10
Fairfield, Ala. T2 .....5.10
Farrell, Pa. S3 .....5.10
Fontana, Calif. K1 ....5.825
Gary, Ind. U5 .....5.10
Ind. Harbor, Ind. I-2, Y1..5.10
Johnstown, Pa. (25) B2 ..5.10
Lackaw'na, N.Y. (25) B2..5.10
LosAngeles (25) B3 ....5.85
LosAngeles C1 .....8.60
Minnequa, Colo. C10 ....6.20
Riverdale, Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle (25) B3 .....6.10
Seattle N14 .....6.60
Sharon, Pa. S3 .....5.10
S. Chicago, Ill. W14 ....5.10
S. SanFrancisco (25) B3..5.85
SparrowsPoint, Md. B2 ..5.10
Torrance, Calif. C11 ....5.85
Warren, O. R2 .....5.10
Weirton, W.Va. W6 ....5.10
Youngstown U5 .....5.10

STRIP, Hot-Rolled Alloy

Carnegie, Pa. S18 .....8.40
Farrell, Pa. S3 .....8.40
Gary, Ind. U5 .....8.40
Houston S5 .....8.65
Ind. Harbor, Ind. Y1 ....8.40
KansasCity, Mo. S5 ....8.65
LosAngeles B3 .....9.60
Lowellville, O. S3 .....8.40
Newport, Ky. A2 .....8.40
Sharon, Pa. A2, S3 .....8.40
S. Chicago, Ill. W14 ....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland, Ky. A10 .....7.575
Bessemer, Ala. T2 ..7.575
Conshohocken, Pa. A3 ..7.575
Ecorse, Mich. G5 .....7.575
Fairfield, Ala. T2 .....7.575
Farrell, Pa. S3 .....7.575
Gary, Ind. U5 .....7.575
Ind. Harbor, Ind. I-2, Y1 7.575
Lackawanna, N.Y. B2 ..7.575
LosAngeles (25) B3 ....8.325
Seattle (25) B3 .....8.575
Sharon, Pa. S3 .....7.575
S. Chicago, Ill. W14 ....7.575
S. SanFrancisco (25) B3..8.325
SparrowsPoint, Md. B2 .7.575
Warren, O. R2 .....7.575
Weirton, W.Va. W6 ....7.575
Youngstown U5, Y1 ...7.575

STRIP, Hot-Rolled Ingot Iron

Ashland, Ky. (8) A10 ...5.35
Warren, O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson, Ind. G6 .....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7, J5 .....7.425
Dearborn, Mich. S3 .....7.425
Detroit D2, M1, P20...7.425
Dover, O. G6 .....7.425
Evanston, Ill. M22 .....7.525
Farrell, Pa. S3 .....7.425
Follansbee, W.Va. W10 .7.425
Fontana, Calif. K1 .....9.20
FranklinPark, Ill. T6 ..7.525
Ind. Harbor, Ind. Y1 ...7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport, Pa. E10 ..7.525
NewBedford, Mass. R10 .7.875
NewBritain, Conn. S15..7.875
NewCastle, Pa. B4, E5 .7.425
NewHaven, Conn. D2 ..7.875
NewKensington, Pa. A6 .7.425
Pawtucket, R.I. R3 ....7.975
Pawtucket, R.I. N8 ....7.975
Philadelphia P24 .....7.875
Pittsburgh J5 .....7.425
Riverdale, Ill. A1 .....7.525
Rome, N.Y. (32) R6 ....7.425
Sharon, Pa. S3 .....7.425
Trenton, N.J. (31) R5 ..8.875
Wallingford, Conn. W2..7.875
Warren, O. R2, T5 .....7.425
Worcester, Mass. A7 ...7.975

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie, Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover, O. G6 .....15.55
Farrell, Pa. S3 .....15.55
FranklinPark, Ill. T6 ..15.55
Harrison, N.J. C18 .....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville, O. S3 .....15.55
Pawtucket, R.I. N8 ....15.90
Riverdale, Ill. A1 .....15.55
Sharon, Pa. S3 .....15.55
Worcester, Mass. A7 ...15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn, Mich. S3 ....10.80
Dover, O. G6 .....10.80
Farrell, Pa. S3 .....10.80
Ind. Harbor, Ind. Y1 ...10.80
Sharon, Pa. S3 .....10.80
Warren, O. R2 .....10.80

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie, Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn, Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover, O. G6	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. M22	8.95	10.40	12.60	15.60	....
Farrell, Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria, O. S1	10.05	10.40	12.60	15.60	....
FranklinPark, Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison, N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain, Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle, Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven, Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington, Pa. A6	9.85	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket, R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome, N.Y. (32) R6	8.95	10.40	12.60	15.60	18.55
Sharon, Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton, N.J. R5	....	10.70	12.90	15.90	18.85
Wallingford, Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren, O. T5	8.95	10.40	12.60	15.60	18.55
Worcester, Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol, Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria, O. S1	19.05	22.15	....
FranklinPark, Ill. T6	19.20	23.30	28.15
Harrison, N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer, Mass. W12	18.85	....	....
Trenton, N.J. R5	18.85	22.95	27.80
Worcester, Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

Weirton, W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Cold-Rolled Ingot Iron

Warren, O. R2 .....8.175

STRIP, C.R. Electrogalvanized

Cleveland A7 .....7.425*
Dover, O. G6 .....7.425*
Evanston, Ill. M22 ....7.525*
McKeesport, Pa. E10 ...7.50*
Riverdale, Ill. A1 .....7.525*
Warren, O. B9, S3, T5..7.425*
Worcester, Mass. A7 ...7.975
Youngstown S41, Y1..7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell, Pa. S3 .....7.50
Sharon, Pa. S3 .....7.50

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.65
Farrell, Pa. S3 .....5.525
Riverdale, Ill. A1 .....5.675
Sharon, Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$9.10	$9.35	$9.75
Fairfield, Ala. T2	9.20	9.45	9.85
Fairless, Pa. U5	9.20	9.45	9.85
Fontana, Calif. K1	9.75	10.00	10.40
Gary, Ind. U5	9.10	9.35	9.75
GraniteCity, Ill. G4	9.20	9.45	9.60
IndianaHarbor, Ind. I-2, Y1	9.10	9.35	9.75
Irvin, Pa. U5	9.10	9.35	9.75
Niles, O. R2	9.10	9.35	9.75
Pittsburg, Calif. C11	9.75	10.00	10.40
SparrowsPoint, Md. B2	9.10	9.35	9.75
Weirton, W.Va. W6	9.10	9.35	9.75
Yorkville, O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)			
IndianaHarbor, Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles, O. R2 (20-27 Ga.)	7.90	8.10	8.30
Aliquippa, Pa. J5 (21-27 Ga.)	7.90	8.10	....

TIN PLATE, American	1.25 lb	1.50 lb
Aliquippa, Pa. J5	$10.40	$10.65
Fairfield, Ala. T2	10.50	10.75
Fontana, Calif. K1	11.05	11.30
Gary, Ind. U5	10.40	10.65
Ind. Harb. Y1	10.40	10.65
Irvin, Pa. U5	10.40	10.65
Pitts., Calif. C11	11.05	11.30
Sp. Pt., Md. B2	10.40	10.65
Weirton, W.Va. W6	10.40	10.65
Yorkville, O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa, Pa. J5	$8.20
Fairfield, Ala. T2	8.30
Fairless, Pa. U5	8.30
Fontana, Calif. K1	8.85
Gary, Ind. U5	8.20
GraniteCity, Ill. G4	8.30
Ind. Harbor, Ind. I-2, Y1	8.20
Irvin, Pa. U5	8.20
Niles, O. R2	8.20
Pittsburg, Calif. C11	8.85
SparrowsPoint, Md. B2	8.20
Weirton, W.Va. W6	8.20
Yorkville, O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa, Pa. J5	7.85
Gary, Ind. U5	7.85
GraniteCity, Ill. G4	7.95
Ind. Harbor, Ind. Y1	7.85
Irvin, Pa. U5	7.85
Yorkville, O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary, Ind. U5	$10.05
Irvin, Pa. U5	10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom, W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge, Pa. A4	....	....	12.40	13.55	14.65
GraniteCity, Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor, Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield, O. E6	9.875*	11.70	12.40	13.55	14.65
Newport, Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles, O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift, Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren, O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville, O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift, Pa. U5	8.10
Mansfield, O. E6	8.10
Warren, O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths) Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom, W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift, Pa. U5	15.70	16.30	16.80	17.85
Zanesville, O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge, Pa. A4	18.10	19.70	20.20	20.70	15.70††
Butler, Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift, Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren, O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity, Ala. R2 ..8.00
Aliquippa, Pa. J5 .....8.00
Alton, Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville, Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 .....8.00
Crawfordsville, Ind. M8..8.10
Donora, Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield, Ala. T2 .....8.00
Fostoria, O. (24) S1 .....8.10
Houston S5 .....8.25
Jacksonville, Fla. M8 ...8.35
Johnstown, Pa. B2 .....8.00
Joliet, Ill. A7 .....8.00
KansasCity, Mo. S5 .....8.25
Kokomo, Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa, Colo. C10 ....8.25
Monessen, Pa. P7, P16 ..8.00
Palmer, Mass. W12 .....8.30
Pittsburg, Calif. C11 ...8.95
Portsmouth, O. P12 ....8.00
Rankin, Pa. A7 .....8.00
S. Chicago, Ill. R2 .....8.00
S. SanFrancisco C10 ....8.95
SparrowsPoint, Md. B2 ..8.10
Sterling, Ill. (1) N15 .....8.00
Sterling, Ill. N15 .....8.10
Struthers, O. Y1 .....8.00
Waukegan, Ill. A7 .....8.00
Worcester, Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria, O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville, Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora, Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown, Pa. B2 ....13.40
KansasCity, Mo. U3 ....12.90
Minnequa, Colo. C10 ...12.775
Monessen, Pa. P7, P16..12.65
Muncie, Ind. I-7 .....13.60
NewHaven, Conn. A7 ..12.95
Palmer, Mass. W12 ....13.70
Pittsburg, Calif. C11 ...13.45
Portsmouth, O. P12 ....12.65
Roebling, N.J. R5 .....12.95
SparrowsPt., Md. B2 ..13.50
Struthers, O. Y1 .....13.40
Trenton, N.J. A7 .....12.95
Waukegan, Ill. A7 .....12.65
Worcester, Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa, Pa. J5 .....9.75
Alton, Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora, Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown, Pa. B2 .....9.75
KansasCity, Mo. S5, U3 .10.00
LosAngeles B3 .....10.70
Minnequa, Colo. C10 ....9.95
Monessen, Pa. P7, P16 ..9.75
NewHaven, Conn. A7 ...10.05
Palmer, Mass. W12 ....10.05
Pittsburg, Calif. C11 ...10.70
Portsmouth, O. P12 ....9.75
Roebling, N.J. R5 .....10.05
S. Chicago, Ill. R2 .....9.75
S. SanFrancisco C10 ....10.70
SparrowsPt., Md. B2 ...9.85
Struthers, O. Y1 .....9.75
Trenton, N.J. A7 .....10.05
Waukegan, Ill. A7 .....9.75
Worcester, Mass. A7 ...10.05

WIRE, MB Spring, High-Carbon

Aliquippa, Pa. J5 .....9.75
Alton, Ill. L1 .....9.95
Bartonville, Ill. K4 .....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora, Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria, O. S1 .....9.80
Johnstown, Pa. B2 .....9.75
KansasCity, Mo. S5, U3..10.00
LosAngeles B3 .....10.70
Milbury, Mass. (12) N6..10.05
Minnequa, Colo. C10 ....9.95
Monessen, Pa. P7, P16 ..9.75
Muncie, Ind. I-7 .....9.95
Palmer, Mass. W12 ....10.05
Pittsburg, Calif. C11 ...10.70
Portsmouth, O. P12 ....9.75
Roebling, N.J. R5 .....10.05
S. Chicago, Ill. R2 .....9.75
S. SanFrancisco C10 ....10.70
SparrowsPt., Md. B2 ...9.85
Struthers, O. Y1 .....9.75
Trenton, N.J. A7 .....10.05
Waukegan, Ill. A7 .....9.75
Wor'ster, Mass. A7, J4, T6 10.05

WIRE, Fine & Weaving (8" Coils)

Alton, Ill. L1 .....16.50
Bartonville, Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville, Ind. M8..16.40
Fostoria, O. S1 .....16.30
Houston S5 .....16.55
Jacksonville, Fla. M8 ..16.65
Johnstown, Pa. B2 ....16.30
KansasCity, Mo. S5 ....16.55
Kokomo, Ind. C16 .....16.30
Minnequa, Colo. C10 ...16.55
Monessen, Pa. P16 .....16.30
Muncie Ind. I-7 .....16.50
Palmer, Mass. W12 .....16.60
S. SanFrancisco C10 ....17.15
Waukegan, Ill. A7 .....16.30
Worcester, Mass. A7, J6..16.60

WIRE, Tire Bead

Bartonville, Ill. K4 ....17.15
Monessen, Pa. P16 .....17.15
Roebling, N.J. R5 .....17.65

ROPE WIRE	(A)
Bartonville, Ill. K4	13.45
Buffalo W12	13.45
Fostoria, O. S1	13.45
KansasCity, Mo. U3	13.70
Johnstown, Pa. B2	13.45
Monessen, Pa. P7	13.45
Muncie, Ind. I-7	13.65
Palmer, Mass. W12	13.75
Portsmouth, O. P12	13.45
Roebling, N.J. R5	13.75
St. Louis L8	13.45
SparrowsPt., Md. B2	13.55
Struthers, O. Y1	13.45
Worcester, Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

Wire, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Allquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb keg) to Distributors (33)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$9.24
Atlanta A11	10.36
Bartonville,Ill. K4	9.34
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	9.34
Donora,Pa. A7	9.24
Duluth A7	9.24
Fairfield,Ala. T2	9.24
Houston S5	10.51
Jacksonville,Fla. M8	9.34
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	9.24
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	9.34
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	9.94
S.Chicago,Ill. R2	9.24
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill.(37) N15	9.34

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.54
Atlanta A11	10.70
Bartonville,Ill. K4	9.64
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.64
Donora,Pa. A7	9.54
Duluth A7	9.54
Fairfield,Ala. T2	9.54
Houston S5	10.85
Jacksonville,Fla. M8	9.64
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	9.54
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.64
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	10.26
S.Chicago,Ill. R2	9.54
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill.(37) N15	9.64

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.59
Atlanta A11	10.75
Bartonville,Ill. K4	9.69
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.69
Donora,Pa. A7	9.59
Duluth A7	9.59
Fairfield,Ala. T2	9.59
Houston S5	10.90
Jacksonville,Fla. M8	9.69
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	9.59
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	9.69
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.59
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	9.69

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Allquippa,Pa. J5	190§
Atlanta A11	198§
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Allq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	192§
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE (16 gage)

	An'ld Galv.	Stone
Ala.City,Ala. R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Cleveland A7	17.85	....
Craw'dville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.25	18.80†
Minnequa C10	18.10	19.65**
P'lm'r,Mass. W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WIRE, Merchant Quality (6 to 8 gage)

	An'ld Galv.
Ala.City,Ala. R2	9.00 9.55**
Aliquippa J5	8.65 9.325§
Atlanta(48)A11	9.10 9.775§
Bartonville(48) K4	9.10 9.80
Buffalo W12	9.00 9.55†
Cleveland A7	9.00 ....
Crawfordsville M8	9.10 9.80††
Donora,Pa. A7	9.00 9.55†
Duluth A7	9.00 9.55†
Fairfield T2	9.00 9.55†
Houston(48) S5	9.25 9.80**
Jack'ville,Fla. M8	9.10 9.80††
Johnstown(48) B2	9.00 9.675§
Joliet,Ill. A7	9.00 9.55†
Kans.City(48) S5	9.25 9.80**
Kokomo(48) S16	9.10 9.65†
LosAngeles B3	9.95 10.625§
Monessen(48) P7	8.65 9.35§
Palmer,Mass. W12	9.30 9.85†
Pitts.,Calif. C11	9.95 10.50†
Rankin,Pa. A7	9.00 9.55†
S.Chicago R2	9.00 9.55**
S.SanFran. C10	9.95 10.50**
Spar'wsPt.(48)B2	9.10 9.775§
St'ling(37)(48) N15	9.10 9.80
Struthers O. Y1	9.00 9.65‡
Worcester,Mass. A7	9.30 9.85†

Based on zinc price of: *13.50, †5c, $10c, ††Less than 10c, ††10.50c, ‡‡11.00c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, shipments of one to four containers, per cent off list, f.o.b. mill)

BOLTS

Machine Bolts

Full Size Body (cut thread)

½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0
Longer than 6 in.	37.0
⅝ in., 3 in. & shorter	47.0
3¼ in. thru 6 in.	40.0
Longer than 6 in.	31.0
¾ in. thru 1 in.:	
6 in. and shorter	37.0
Longer than 6 in.	31.0
1⅛ in. and larger:	
All lengths	31.0

Undersize Body (rolled thread)

½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0

Carriage Bolts

Full Size Body (cut thread) & Undersize Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

Lag, Plow, Tap, Blank, Step, Elevator, Tire, and Fitting Up Bolts

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

High Tensile Structural Bolts (Reg. semifinished hex head bolts, heavy semifinished hex nuts. Bolts — High-carbon steel, heat treated, Spec. ASTM A-325, in bulk. Full keg quantity)

⅝ in. diam	50.0
¾ in. diam	47.0
⅞ and 1 in. diam	43.0
1⅛ and 1¼ in. diam	34.0

NUTS

(Keg or case quantity and over)

Square Nuts, Reg. & Heavy:

All sizes	56.0

(Full container)

Hex Nuts, Reg. & Heavy Hot Pressed & Cold Punched:

¾ in. and smaller	62.0
⅞ in. to 1½ in., incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller	62.0
⅞ in. to 1½ in. incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Finished (Incl. Slotted and Castellated):

⅞ in. and smaller	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):

⅝ in. and smaller	62.0
¾ in. to ⅞ in., incl.	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

CAP AND SETSCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread, Bright:

6 in. and shorter:

⅝ in. and smaller	35.0
¾, ⅞, and 1 in.	16.0

Longer than 6 in.:

⅝ in. and smaller	3.0
¾, ⅞, and 1 in.	+11.0

High Carbon, Heat Treated:

6 in. and shorter:

⅝ in. and smaller	20.0
¾, ⅞, and 1 in.	+5.0

Longer than 6 in.:

⅝ in. and smaller	+19.0
¾, ⅞, and 1 in.	+39.0

Flat Head Cap Screws:

⅜ in. and smaller, 6 in. and shorter +85.0

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam:

6 in. and shorter	+5.0
Longer than 6 in.	+29.0

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85, 7/16 in. and smaller by 6 in. and shorter: 15% off list.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2½	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.60	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa, Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	14.75
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2,Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 9.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) New Haven, Conn., base.
(21) Deld. San Francisco Bay area.
(22) Special quality.
(23) Deduct 0.05c, finer than 15 Ga.
(24) Bar mill bands.
(25) Deld. in mill zone, 6.295c.
(26) Bar mill sizes.
(27) Bonderized.
(28) Youngstown base.
(29) Sheared; for universal mill add 0.45c.
(30) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(31) Buffalo base.
(32) To jobbers, deduct 20c.
(33) 9.60c for cut lengths.
(34) 72" and narrower.
(35) 54" and narrower.
(36) Chicago base, 10 points lower.
(37) 13 Ga. & lighter; 60" & narrower.
(38) 48" and narrower.
(39) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(40) 9.10c for cut lengths.
(41) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.635c.
(42) 9-14½ Ga.
(43) To fabricators.
(44) 6-7 Ga.
(45) 3½ in. and smaller rounds; 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Youngstown Y1	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown B2	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	¼		⅜		½		⅝		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Alton, Ill. L1	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Benwood, W. Va. W10	1.5	+25	+10.5	+34	+21	+42.5	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Butler, Pa. F6	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+26	+7.75	+22	+4.25	+17.5	+1.75	+16.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+14	4.25	+10	7.75	+5.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sharon, Pa. S4	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sparrows Pt., Md. B2	2.5	+24	+10.5	+34	+21.5	+43	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Wheatland, Pa. W9	4.5	+22	+8.5	+32	+19.5	+41	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Alton, Ill. L1	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Benwood, W. Va. W10	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Etna, Pa. N2	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Fairless, Pa. N3	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+5.5	1.25	+15.5	1.25	+15.5
Fontana, Calif. K1	+1.25	+16.75	+0.75	+15.25	9.75	+15.5	9.75	+15.5	+9.75	+26.5	+9.75	+26.5
Indiana Harbor, Ind. Y1	10.75	+3.75	11.25	+3.25	12.75	+3.5	12.75	+3.5	2.25	+14.5	2.25	+14.5
Lorain, O. N3	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Sharon, Pa. M6	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Wheatland, Pa. W9	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Youngstown R2, Y1	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5

*Galvanized pipe discounts based on price of zinc at 11.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
306	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary, Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.55	....
Nickel	41.65	51.95	63.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	$35.85	$42.50

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	V-Cr Hot Work (H-13)	0.550
Spec. Carbon (W-1)	0.385	W-Cr Hot Work (H-12)	0.530
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.595	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago, Ill. R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	68.00	68.50	69.00	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	67.50	68.00	68.50	....
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	....	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.
Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry. 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035% max)	$73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Troy, N.Y. R2 (Phos. 0.035% max)	73.00
Philadelphia, deld.	81.67
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075%)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††§		Carbon	Floor
Atlanta	8.59‖	9.86‖	10.13	....	8.91	9.39	13.24#	....	9.40	9.29	11.21
Baltimore	8.55	9.25	9.99	....	9.05	9.45	11.85#	15.48	9.55	9.00	10.50
Birmingham	8.18	9.45	10.46	....	8.51	8.99	....	....	9.00	8.89	10.90
Boston	10.07	11.42	11.92	53.50	12.17	10.19	13.30#	15.64	10.64	10.27	11.95
Buffalo	8.40	9.60	10.85	55.98	8.75	9.15	11.45#	15.40	9.25	9.20	10.75
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.25	9.45	10.90	53.00	8.51	8.99	9.15	15.05	9.00	8.89	10.20
Cincinnati	8.43	9.51	10.95	53.43	8.83	9.31	11.58#	15.37	9.56	9.27	10.53
Cleveland	8.54(a)	8.79(b)	10.87(a)	52.33	10.32(c)	8.75(d)	11.25#	15.16	9.39	8.71(e)	10.50(f)
Dallas	8.80	9.30	....	....	8.85	8.80	....	....	8.75	9.15	10.40
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.51	9.71	11.25	56.50	8.88	9.30	9.51	15.33	9.56	9.26	10.46
Erie, Pa.	8.35	9.45	9.95[10]	....	8.60	9.10	11.25	....	9.35	9.10	10.60
Houston	8.40	8.90	10.29	52.00	8.45	8.40	11.60	15.75	8.35	8.75	10.10
Jackson, Miss.	8.52	9.79	....	....	8.84	9.82	10.68	....	9.33	9.22	11.03
Los Angeles	8.70[2]	10.80[2]	12.20	57.60	9.15	9.10[2]	12.95[2]	16.35	9.00[2]	9.10[2]	11.30[2]
Memphis, Tenn.	8.59	9.80	....	....	8.84	9.32	11.25#	....	9.33	9.22	10.86
Milwaukee	8.39	9.59	11.04	....	8.65	9.13	9.39	15.19	9.22	9.03	10.34
Moline, Ill.	8.55	9.80	....	....	8.84	8.95	9.15	....	8.99	8.91	....
New York	9.17	10.49	11.30	53.08	9.64	9.99	13.25#	15.50	9.74	9.77	11.05
Norfolk, Va.	8.65	....	....	....	9.15	9.30	12.75	....	9.65	9.10	10.50
Philadelphia	8.20	9.55	10.61	52.71	9.25	9.40	11.95#	15.48	9.10	9.15	10.40**
Pittsburgh	8.54(a)	8.79(b)	10.76(a)	52.33	10.30(c)	8.64(d)	11.25#	15.05	9.00	8.47(e)	10.26(f)
Richmond, Va.	8.65	....	10.79	....	9.15	9.55	....	....	9.65	9.10	10.60
St. Louis	8.63	9.83	11.28	....	8.89	9.37	9.78	15.43	9.48	9.27	10.58
St. Paul	8.79	10.04	11.49	....	8.84	9.21	9.86	....	9.38	9.30	10.49
San Francisco	9.65	11.10	11.40	55.10	9.75	10.15	13.60	16.25	9.85	10.00	12.35
Seattle	10.30	11.55	12.50	56.52	10.25	10.50	14.70	16.80[2]	10.20	10.10	12.50
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	10.30	11.55	12.50	57.38	10.75	11.00	14.70	16.80	10.20	10.10	13.00
Washington	9.15	....	....	....	9.65	10.05	12.50	....	10.15	9.60	11.10

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡¾ in. to 4 in. wide, inclusive; #net price, 1 in. round C-1018.
(a)10 Ga.; (b)20 Ga.; (c)⅛ x 1 in.; (d)¾-2½ in.; (e)¼ x 84 in.; (f)¼ x 36.
Base quantities, 2000 to 4999 lb except as noted; cold-finished bars, 2000 lb and over except in Seattle, 2000 to 3999 lb; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Seattle, 30,000 lb and over; [2]—30,000 lb; [3]—1000 to 4999 lb; [5]—1000 to 1999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchens, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 sts.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $26.50-$27; barge, Brownsville, Tex., $29-$29.50.

Ores

Lake Superior Iron Ore

(Prices effective at start of the 1959 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1959, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates ..... nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	21.00†
Brazilian iron ore, 68.5%	22.60

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$16-$17†
Domestic, concentrates f.o.b. milling points	16.00-17.00†

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian 88.5-91.5c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$42.00-44.00†
48% 2.8:1	38.00-40.00†
48% no ratio	29.00-31.00†

South African Transvaal

44% no ratio	19.75-21.00
48% no ratio	29.00-31.00

Turkish

48% 3:1	51.00-55.00†

Domestic

Rail nearest seller

18% 3:1	39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

50-55%	$2.25-2.40
60-65%	2.50-3.10

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Diam (Inches)	Length (Inches)	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5⅛	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.25
100 mesh, pails	9.10§
40 mesh, bags	8.10††
Electrolytic Iron,	
Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
1.3 in.	28.75
(In contract lots of 240 tons price is 22.75c)	
Annealed, 99.5% Fe	36.50
Unannealed (99+% Fe)	36.00
Unannealed (99+% Fe) (minus 325 mesh)	59.00
Powder Flake (minus 16 plus 100 mesh),	29.00
Carbonyl Iron: 98.1-98.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500-lb drum, freight allowed, c.l.	38.50; ton lots 40.50
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	34.20-50.70†
Bronze, 5000-lb lots	52.10-56.10†
Copper, electrolytic	14.25*
Copper, reduced	14.25*
Lead	7.50*
Manganese, Electrolytic: Minus 50 mesh	43.00
Nickel	80.60
Nickel-Silver, 5000-lb lots	52.70-57.10†
Phosphor-Copper, 5000-lb lots	64.50
Copper (atomized) 5000-lb lots	45.00-53.50
Solder	7.00*
Stainless Steel, 304	$0.89
Stainless Steel, 316	$1.07
Tin	14.00*
Zinc, 5000-lb lots	19.20-32.40‡
Tungsten:	Dollars
Carbon reduced, 98.8% min, minus 65 mesh	nom**
Chromium, electrolytic 99.8% Cr, min. metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. § Cutting and scrafing grade. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg	5.00
Toluene one deg (del. east of Rockies)	25.00

Cents per lb, f.o.b. tank cars or tank trucks, deld.

Phenol, 90 per cent grade	14.75

Per net ton bulk, f.o.b. cars or trucks, plant

Ammonium sulfate, regular grade	$32.00

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes*	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	*$6.18*	....	*$6.13*	*$6.04*	*$6.41*
Bar Size Angles	*6.18*	....	*6.13*	*6.04*	*6.41*
Structural Angles	6.03	....	5.98	5.88	6.28
I-Beams	6.03	....	5.98	5.88	6.28
Channels	6.03	....	5.98	5.88	6.28
Plates (basic bessemer)	*5.95*	....	*5.90*	*5.80*	*6.20*
Sheets, H.R.	*9.00*	....	*8.95*	*8.85*	*9.25*
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	*9.90*	....	*9.85*	*9.75*	*10.25*
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	*10.05*	....	*10.00*	*9.90*	*10.30*
Sheets, C.R. (drawing quality)	*10.00*	....	*10.95*	*10.85*	*11.25*
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	*25.50*	....	*25.28*	*24.99*	*26.68*
Barbed Wire (†)	*8.00*	....	*7.95*	*7.85*	*8.25*
Merchant Bars	6.18	....	6.13	6.04	6.41
Hot-Rolled Bands	*8.90*	....	*8.85*	*8.75*	*9.15*
Wire Rods, Thomas Commercial No. 5	*6.40*	....	*6.40*	*6.25*	*6.60*
Wire Rods, O.H.	*6.90*	....	*6.90*	*6.75*	*7.10*
Bright Common Wire Nails (§)	*8.40*	....	*8.45*	*8.35*	*8.75*

*Books closed for 1959-60 shipping season. †Per 82 lb net reel. §Per 100-lb kegs, 20d nails and heavier.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Neville Island, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $245, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.5% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn; packed, carload 26.8c, ton lot 28.4c, less ton 29.6c.

Electrolytic Manganese Metal: Min carload, bulk, 33.25c; 2000 lb to min carload 36c; less ton, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome 1: Cr 63%, C 6% max, Si 7% max, 22c. **Charge Chrome 2:** Cr 50-59%, C 8% max, Si 6% max, 23c. Carload, lump, bulk, per lb Cr.

Refined Chrome 1: Cr 50-59%, C 5% max, Si 2% max, 25c. **Refined Chrome 2:** Si 12% max, 24c. Carload, lump, bulk, per lb Cr.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Delivered.

Cr 67-71%, carload, lump, bulk, 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). 8M x D, carload, bulk, 20.05c per lb of alloy, carload packed, 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" x down, 28.25c per lb contained Cr, 14.60c per lb contained Si, 0.75" x down 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed, 2" x D plate (about ¼" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3⅛ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 14.8c per lb of briquet; c.l., packed ,bags 16c; 3000 lb to c.l., pallets 16c; 2000 lb to c.l., bags 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 15.1c per lb of briquet; c.l. packed, bags 16.3c, 3000 lb to c.l., pallets 16.3c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb or briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l.; bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carloc bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

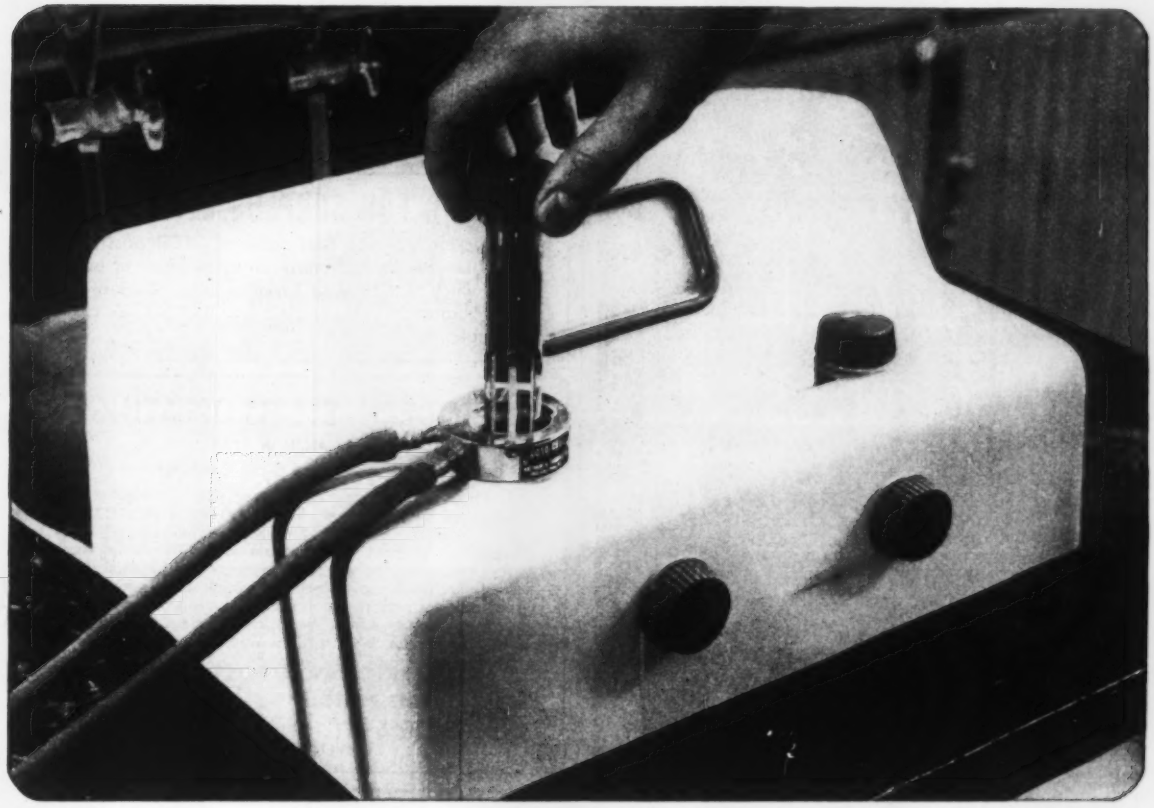
Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

***Experience**—the added alloy in **Allegheny Ludlum** tool steels*



COLORIMETER (inherently extremely accurate) determines percentages of molybdenum, tungsten, cobalt and manganese in A-L tool steel to insure consistent, high quality.

Colorimeter measures exact chemical composition of Allegheny Ludlum tool steel melts

Accurate adjustment of alloys guarantees uniform heat treatment, predictable dimensional changes, reduced grinding, standardized machining operations.

Close control of molybdenum, tungsten, cobalt and manganese is at the heart of a good tool steel melt. In addition to the usual testing methods, Allegheny Ludlum's chemical laboratory checks these metals with Colorimetry because of its inherent, extreme accuracy.

On the basis of the Colorimeter's findings, it is possible to make carefully calculated furnace additions of ferro-alloys, insuring precise control over chemistry. This guarantees your receiving the *exact* analysis order after order, providing *uniformity of heat treatment, predictable dimensional changes, reduced grinding and standardized machining operations.*

WBW-7262

Colorimetry is but one step toward careful control over composition. Allegheny Ludlum also sets exacting purchasing specifications on raw materials and scrap. Quality Control checks all incoming orders to see that they conform with these specifications. Another guard toward your getting your exact specifications: each ingot bears a metal tab showing heat number.

Allegheny Ludlum stocks a complete line of tool steel sizes and grades. Call your nearest A-L representative; you'll get quick service and counsel on such problems as heat treating, machining, grade selection, etc. Or write for A-L's publication list which gives full data on the more than 125 technical publications offered. They'll make your job easier.

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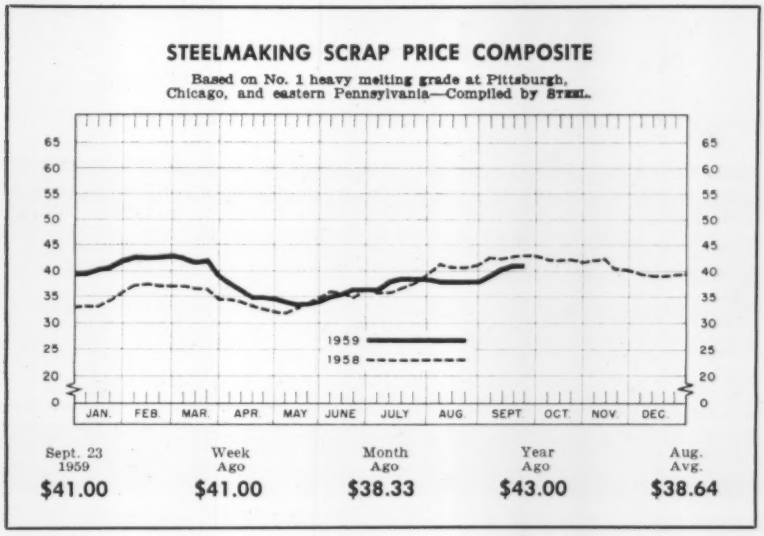

Scrapmen Anticipate Active Demand

STEEL's index on No. 1 heavy melting holds steady, but market undertone is strong. Heavy poststrike movement expected as iron ore shortage next spring threatens

Scrap Prices, Page 192

• **Pittsburgh** — This month's bids on Fisher Body bundles will provide the next test of the market. Brokers for a strikefree mill that took the bulk of last month's Fisher tonnage will bid again, but it's believed their customer is pretty well loaded. Prices will probably be in line with last month's average ($45.10) or a few cents higher. Some of the larger brokers and dealers who don't have any immediate buyers may want to store the scrap in their yards. In general, the trade remains bullish. Dealers are inclined to hold out for higher prices, which they feel are a certainty after the strike.

• **Chicago** — Broker-dealer trading is making for some activity in a local market which otherwise would be quiet. The volume of material moving to the few mills unaffected by the strike is insufficient to sustain prices. But brokers are making commitments with dealers for material which will be needed as soon as steelmaking operations are resumed by strikebound mills. Prices are unchanged but are under upward pressure.

• **Philadelphia** — While higher prices and cooler weather have been

(*Please turn to Page* 197)

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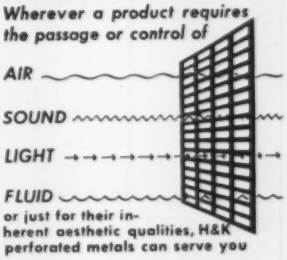

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Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Sept. 23, 1959. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Sept. 23	$41.00
Sept. 16	41.00
Aug. Avg.	38.64
Sept. 1958	42.87
Sept. 1954	29.94

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	33.00-34.00
No. 1 dealer bundles	44.00-45.00
No. 2 bundles	29.00-30.00
No. 1 busheling	41.00-42.00
No. 1 factory bundles	47.00-48.00
Machine shop turnings	21.00-22.00
Mixed borings, turnings	21.00-22.00
Short shovel turnings	24.00-25.00
Cast iron borings	24.00-25.00
Cut structurals:	
2 ft and under	48.00-49.00
3 ft and under	47.00-48.00
Heavy turnings	34.00-35.00
Punchings & plate scrap	49.00-50.00
Electric furnace bundles	47.00-48.00

Cast Iron Grades

No. 1 cupola	47.00-48.00
Stove plate	45.00-46.00
Unstripped motor blocks	33.00-34.00
Clean auto cast	46.00-47.00
Drop broken machinery	52.00-53.00

Railroad Scrap

No. 1 R.R. heavy melt	46.00-47.00
Rails, 2 ft and under	60.00-61.00
Rails, 18 in. and under	61.00-62.00
Random rails	56.00-57.00
Angles, splice bars	55.00-56.00
Railroad specialties	55.00-56.00
Rails, rerolling	64.00-65.00

Stainless Steel Scrap

18-8 bundles & solids	230.00-235.00
18-8 turnings	115.00-120.00
430 bundles & solids	125.00-130.00
430 turnings	55.00-65.00

CHICAGO

No. 1 hvy melt., indus.	41.00-42.00
No. 1 hvy melt., dealer	39.00-40.00
No. 2 hvy melting	36.00-37.00
No. 1 factory bundles	44.00-45.00
No. 1 dealer bundles	40.00-41.00
No. 2 bundles	26.00-27.00
No. 1 busheling, indus.	41.00-42.00
No. 1 busheling, dealer	39.00-40.00
Machine shop turnings	19.00-20.00
Mixed borings, turnings	21.00-22.00
Short shovel turnings	21.00-22.00
Cast iron borings	21.00-22.00
Cut structurals, 3 ft	50.00-51.00
Punchings & plate scrap	51.00-52.00

Cast Iron Grades

No. 1 cupola	55.00-56.00
Stove plate	51.00-52.00
Unstripped motor blocks	46.00-47.00
Clean auto cast	61.00-62.00
Drop broken machinery	61.00-62.00

Railroad Scrap

No. 1 R.R. heavy melt.	44.00-45.00
R.R. malleable	62.00-63.00
Rails, 2 ft and under	60.00-61.00
Rails, 18 in. and under	61.00-62.00
Angles, splice bars	55.00-56.00
Axles	58.00-59.00
Rails, rerolling	62.00-63.00

Stainless Steel Scrap

18-8 bundles, solids	215.00-220.00
18-8 turnings	110-00-115.00
430 bundles & solids	115.00-120.00
430 turnings	55.00-60.00

YOUNGSTOWN

No. 1 heavy melting	*43.00-44.00*
No. 2 heavy melting	27.00-28.00
No. 1 busheling	44.00-45.00
No. 1 bundles	44.00-45.00
No. 2 bundles	25.00-26.00
Machine shop turnings	17.00-18.00
Short shovel turnings	22.00-23.00
Cast iron borings	22.00-23.00
Low phos.	45.00-46.00
Electric furnace bundles	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	43.00-44.00

CLEVELAND

No. 1 heavy melting	*39.00-40.00*
No. 2 heavy melting	27.00-28.00
No. 1 factory bundles	44.00-45.00
No. 1 bundles	40.00-41.00
No. 2 bundles	25.00-26.00
No. 1 busheling	40.00-41.00
Machine shop turnings	14.00-15.00
Short shovel turnings	20.00-21.00
Mixed borings, turnings	20.00-21.00
Cast iron borings	20.00-21.00
Cut foundry steel	40.00-41.00
Cut structurals, plates 2 ft and under	*48.00-49.00*
Low phos. punchings & plate	41.00-42.00
Alloy free, short shovel turnings	22.00-23.00
Electric furnace bundles	41.00-42.00

Cast Iron Grades

No. 1 cupola	*52.00-53.00*
Charging box cast	38.00-39.00
Heavy breakable cast	38.00-39.00
Stove plate	44.00-45.00
Unstripped motor blocks	36.00-37.00
Brake shoes	38.00-37.00
Clean auto cast	*55.00-56.00*
Burnt cast	37.00-38.00
Drop broken machinery	52.00-53.00

Railroad Scrap

R.R. malleabe	65.00-66.00
Rails, 2 ft and under	*60.00-61.00*
Rails, 18 in. and under	*61.00-62.00*
Rails, random lengths	*54.00-55.00*
Cast steel	46.00-47.00
No. 1 railroad cast	55.50-56.50
Railroad specialties	51.00-52.00
Angles, splice bars	53.00-54.00
Rails, rerolling	*69.00-70.00*

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	215.00-220.00
18-8 turnings	110.00-115.00
430 clips, bundles, solids	125.00-130.00
430 turnings	45.00-55.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*36.00*
No. 2 heavy melting	*33.00*
No. 1 bundles	*41.00*
No. 2 bundles	*25.00*
No. 1 busheling	*40.00*
Machine shop turnings	15.50
Short shovel turnings	17.50

Cast Iron Grades

No. 1 cupola	54.00
Charging box cast	45.00
Heavy breakable cast	44.00
Unstripped motor blocks	44.00
Clean auto cast	56.00
Stove plate	45.00

Railroad Scrap

No. 1 R.R. heavy melt.	42.00
Rails, 18 in. and under	51.50
Rails, random lengths	*48.00*
Rails, rerolling	59.00
Angles, splice bars	48.00

BIRMINGHAM

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	38.00-39.00
No. 2 bundles	24.00-25.00
No. 1 busheling	40.00-41.00
Cast iron borings	14.00-15.00
Machine shop turnings	24.00-25.00
Short shovel turnings	27.00-28.00
Bar crops and plates	45.00-46.00
Structurals & plates	44.00-45.00
Electric furnace bundles	40.00-41.00
Electric furnace:	
3 ft and under	38.00-39.00
2 ft and under	39.00-40.00

Cast Iron Grades

No. 1 cupola	*53.00-54.00*
Stove plate	*53.00-54.00*
Charging box cast	29.00-30.00
Unstripped motor blocks	*41.00-42.00*
No. 1 wheels	43.00-44.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00-40.00
Rails, 18 in. and under	52.00-53.00
Rails, rerolling	59.00-60.00
Rails, random lengths	46.00-47.00
Angles, splice bars	44.00-45.00

PHILADELPHIA

No. 1 heavy melting	41.00
No. 2 heavy melting	36.00
No. 1 bundles	42.00
No. 2 bundles	27.00-28.00
No. 1 busheling	42.00
Electric furnace bundles	43.00
Mixed borings, turnings	20.00†
Short shovel turnings	24.00-25.00
Machine shop turnings	20.00-21.00
Heavy turnings	34.00
Structurals & plates	45.00-46.00
Couplers, springs, wheels	47.00
Rail crops, 2 ft & under	60.00-62.00

Cast Iron Grades

No. 1 cupola	41.00-42.00
Heavy breakable cast	45.00
Drop broken machinery	52.00-53.00
Malleable	67.00-68.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	31.00-32.00
No. 2 bundles	20.00-21.00
Machine shop turnings	9.00-10.00†
Mixed borings, turnings	12.00-13.00†
Short shovel turnings	13.00-14.00†
Low phos. structurals & plates	36.00-37.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	34.00-35.00

Stainless Steel

18-8 sheets, clips, solids	195.00-200.00
18-8 borings, turnings	85.00-90.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	85.00-90.00

BUFFALO

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	33.00-34.00
No. 2 bundles	23.00-24.00
No. 1 busheling	33.00-34.00
Short shovel turnings	21.00-22.00
Machine shop turnings	17.00-18.00
Cast iron borings	19.00-20.00
Low phos. structurals and plate, 2 ft and under	43.00-44.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	46.00-47.00
No. 1 machinery	50.00-51.00

Railroad Scrap

Rails, random lengths	45.00-46.00
Rails, 3 ft and under	51.00-52.00
Railroad specialties	43.00-44.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	35.50-36.50
No. 2 heavy melting	30.50-31.50
No. 1 bundles	35.50-36.50
No. 2 bundles	25.00-26.00
No. 1 busheling	35.50-36.50
Machine shop turnings	17.00-18.00
Mixed borings, turnings	17.00-18.00
Short shovel turnings	19.00-20.00
Cast iron borings	18.00-19.00
Low phos., 18 in.	47.00-48.00

Cast Iron Grades

No. 1 cupola	47.00-48.00
Heavy breakable cast	43.00-44.00
Charging box cast	43.00-44.00
Drop broken machinery	57.00-58.00

Railroad Scrap

No. 1 R.R. heavy melt.	41.00-42.00
Rails, 18 in. and under	57.00-58.00
Rails, random lengths	49.00-50.00

HOUSTON

(Exporters' buying prices; f.a.s.)

No. 1 heavy melting	*39.00*
No. 2 heavy melting	*36.00*
No. 2 bundles	25.00-26.00

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	34.00†
No. 2 heavy melting	31.00†
No. 1 bundles	34.00
No. 2 bundles	20.00†
Machine shop turnings	17.00
Short shovel turnings	20.00
Low phos. plates & structurals	45.50-46.50

Cast Iron Grades

No. 1 cupola	47.00-48.00
Heavy breakable	33.00
Foundry malleable	43.00-44.00
Unstripped motor blocks	38.50-39.50

Railroad Scrap

No. 1 R.R. heavy melt.	34.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	25.00-25.50
No. 1 bundles	30.00-31.00
No. 1 busheling	30.00-31.00
Machine shop turnings	10.00-11.00
Short shovel turnings	12.00-13.00
No. 1 cast	37.00-38.00
Mixed cupola cast	36.00-37.00
No. 1 machinery cast	38.00-38.50

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	38.00-39.00
No. 2 bundles	22.00-23.00
No. 1 busheling	34.00-35.00
Machine shop turnings	*14.00-15.00*
Mixed borings, turnings	*15.00-16.00*
Short shovel turnings	*16.00-17.00*

Cast Iron Grades

No. 1 cupola	*48.00-49.00*
Stove plate	40.00-41.00
Heavy breakable	39.00-40.00
Unstripped motor blocks	*32.00-33.00*
Charging box cast	39.00-40.00
Clean auto cast	50.00-51.00

SEATTLE

No. 1 heavy melting	35.00†
No. 2 heavy melting	33.00†
No. 1 bundles	27.00†
No. 2 bundles	22.00†
Machine shop turnings	17.00†
Mixed borings, turnings	17.00†
Electric furnace No. 1	38.00†

Cast Iron Grades

No. 1 cupola	34.00†
Heavy breakable cast	28.00†
Unstripped motor blocks	26.00†
Stove plate (f.o.b. plant)	21.00†

LOS ANGELES

No. 1 heavy melting	38.00-39.00*
No. 2 heavy melting	36.00*
No. 1 bundles	33.00
No. 2 bundles	20.00
Machine shop turnings	16.00
Shovel turnings	18.00
Cast iron borings	18.00
Cut structurals and plate 1 ft and under	48.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	47.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

SAN FRANCISCO

No. 1 heavy melting	36.00
No. 2 heavy melting	33.00
No. 1 bundles	33.00
No. 2 bundles	22.00
Machine shop turnings	16.00
Mixed borings, turnings	16.00
Cast iron borings	16.00
Heavy turnings	16.00
Short shovel turnings	16.00
Cut structurals, 3 ft	42.00

Cast Iron Grades

No. 1 cupola	47.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices)

No. 1 heavy melting	32.25
No. 2 heavy melting	28.25
No. 1 bundles	32.25
No. 2 bundles	22.75
Mixed steel scrap	24.25
Mixed borings, turnings	13.00
Busheling, new factory: Prepared	32.25
Unprepared	26.25
Short steel turnings	17.00

Cast Iron Grades‡

No. 1 machinery cast	46.50-48.00

*Delivered to docks.
†Nominal.
‡F.o.b. Hamilton, Ont.

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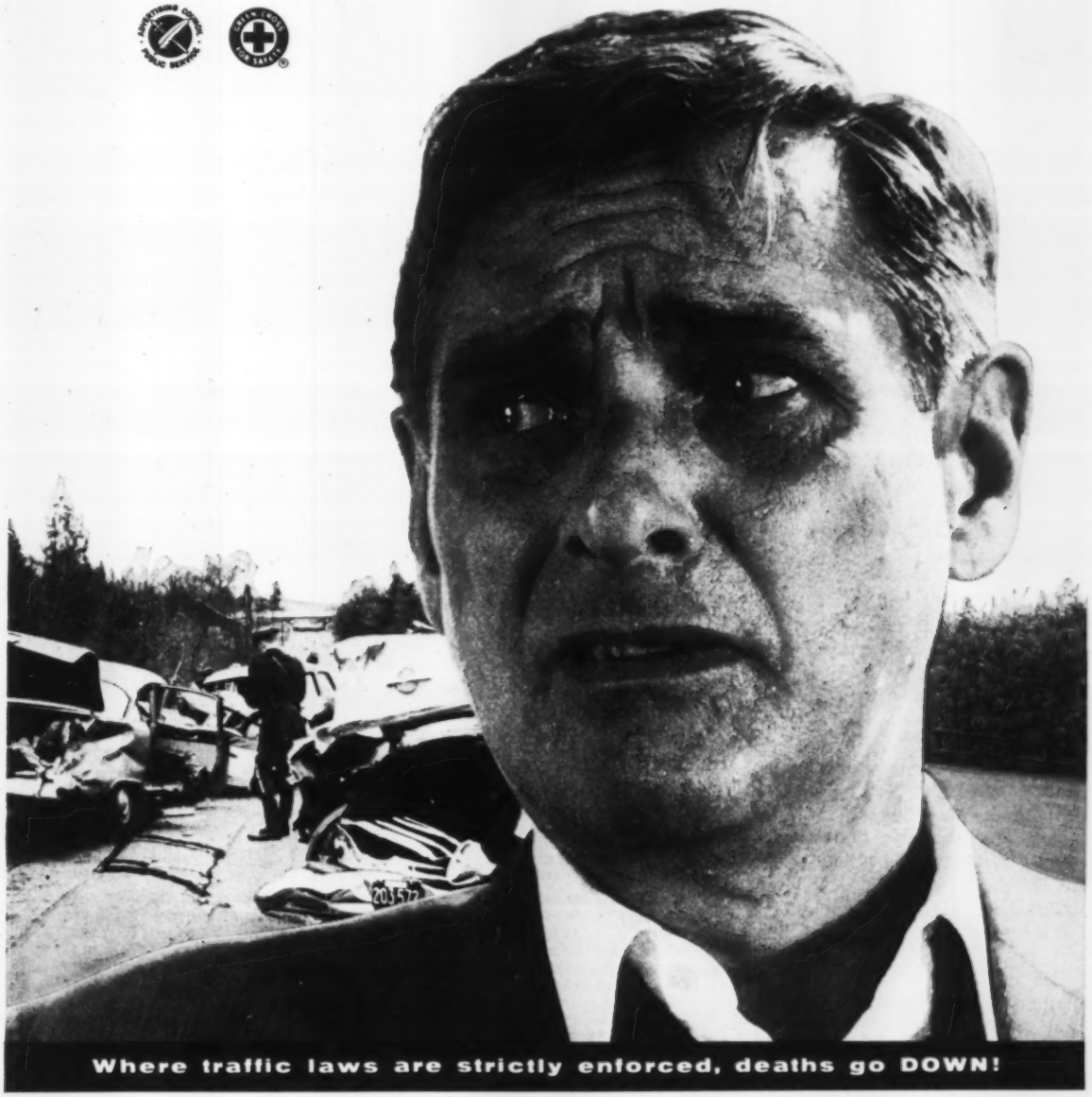

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Zinc Upped to 12 Cents

Good business plus desire to attract foreign material sparked move. Outlook: Another boost within few weeks. Lead quiet. Copper losses pass 138,000 ton mark

Nonferrous Metal Prices, Pages 196 & 197

THE zinc industry, paced by a market that refused to play dead because the steel and copper industries are on strike, raised prices 1 cent a pound across the board last Monday, Sept. 21.

St. Joseph Lead Co. announced the increase to 12 cents a pound (for prime western), and it was only a matter of hours until the other producers followed. It marks the first price change since last February and the highest quotation since May, 1957.

• **Behind the Move**—Strange as it may seem, one of the principal motives was to attract foreign concentrates. Because of the strong market overseas, much of the material slated to enter the U. S. under quotas was being diverted to Europe. Foreign producers, who have to pay around 1.5 cents a pound for ocean freight and the import duties, could still realize a better profit elsewhere when the price was 11 cents.

Business from diecasters, brass mills, hot dip galvanizers, and those continuous line galvanizers not on strike has been surprisingly strong —so good, in fact, that supplies would be tight if there were no strike.

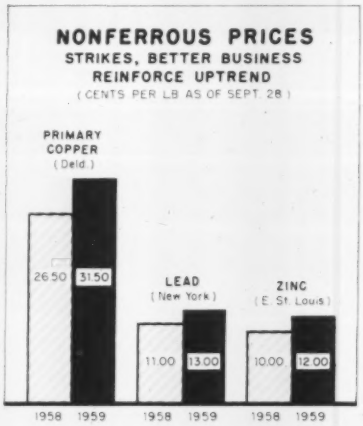
• **Looking Ahead**—Producers unanimously agree that after the steel strike ends there might not be enough zinc available to meet demand. What will be needed, they say, is either a stepup in U. S. mine output or a relaxing of quotas.

Most metalmen believe the line will be held until the strike is settled but admit a hike—probably another cent a pound—could easily come sooner.

• **Lead Quiet** — Don't expect a bullish reaction in the lead market. Business has been slow since the 1-cent-a-pound increase on Aug. 24.

Strike Losses Mount

As of last Friday (Sept. 25), about 138,000 tons of copper had been lost through work stoppages. So far no one has been hurt too badly. But when and if supplies get so low fabricators will have to close shop, look for a strong move to get release of some of the 138,000 tons of copper cathodes and small ingots being held in the government's DPA inventory. But after the recent hassle between stockpile people and Congress, don't look for any disposal without prior consultation with both Congress and industry.



Market Memos

• **Forging Ahead** — If the copper strike ends soon, shipments of brass and bronze ingots will be the highest they've been since 1955. Through August, shipments totaled 186,992 tons compared with 144,408 tons in the year ago period.

• **Trend Begins**—Douglas Aircraft's new DC-8 Jetliner has 1000 lb of titanium built into the airframe. It points up the design away from aluminum in modern aircraft (see STEEL, June 8, p. 110) and opens new vistas for titanium. Its previous major market was in jet engine components.

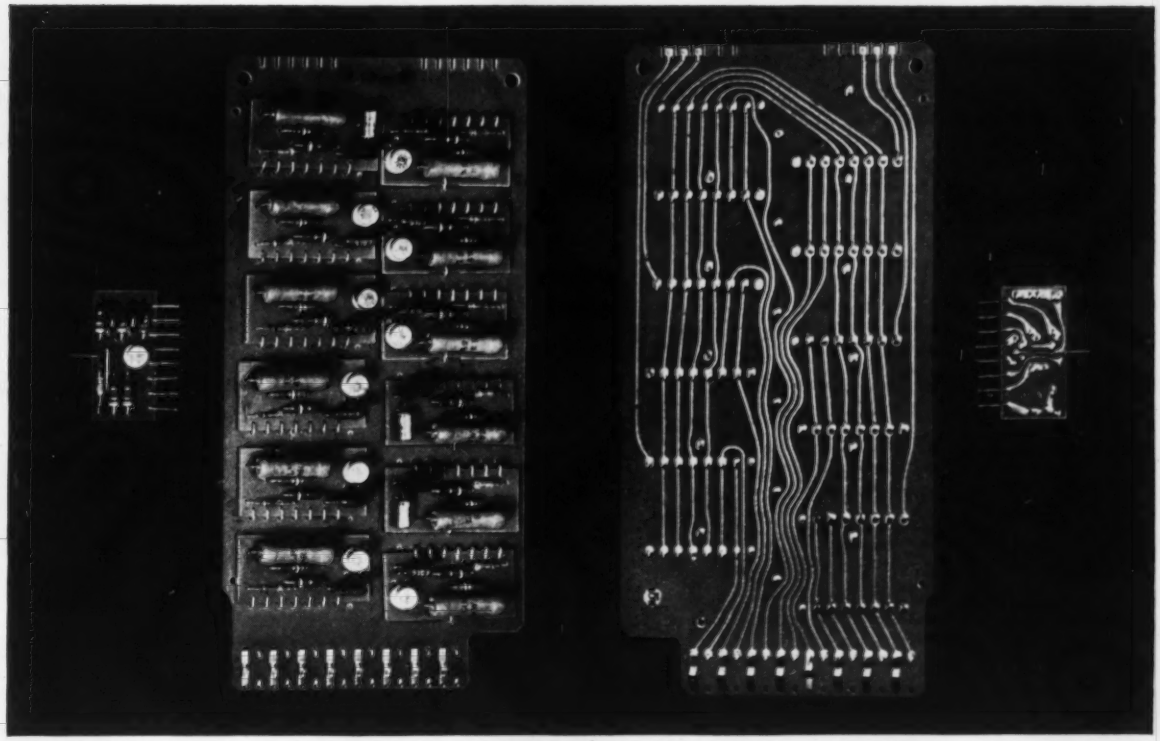
• **Marketers Take Note**—By 1965 the average new home will contain 1000 lb of aluminum, predicts Aluminum Co. of America. It expects the new dwelling market alone to require 500,000 tons for each 1 million homes built—that's more aluminum than the entire building trade (the industry's largest customer) will use this year.

• **Happy Days Ahead** — Spiraling copper uses, mainly outside the U. S., will boost world consumption (exclusive of the Iron Curtain) by about 2 million tons, or more than 50 per cent of present consumption, by 1970, predicts Jean Vuillequez, vice president of American Metal Climax Inc. Net mine capacity, between now and 1963, will increase by about 600,000 tons.

NONFERROUS PRICE RECORD

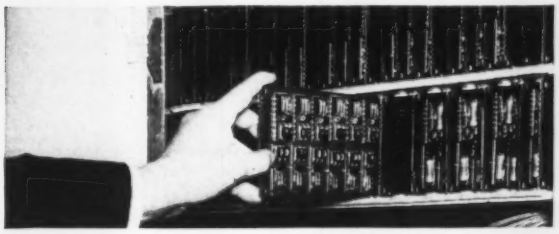
	Sept. 23 Price	Last Change	Previous Price	Aug. Avg	July Avg	Sept., 1958 Avg
Aluminum	24.70	Aug. 1, 1958	24.00	24.700	24.700	24.700
Copper	30.00–33.00	Aug. 31, 1959	30.00	30.010	30.048	26.428
Lead	12.80	Aug. 24, 1959	11.80	12.069	11.800	10.730
Magnesium	35.25	Aug. 13, 1958	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	102.375	Sept. 23, 1959	102.625	102.333	102.298	94.120
Zinc	12.00	Sept. 21, 1959	11.00	11.000	11.000	10.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig 99.8%, Velasco, Tex.

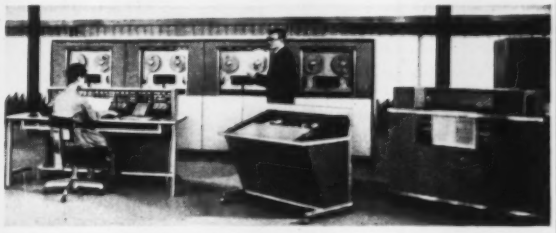


In the electronic logic elements of the RCA "501" data processing system, transistors and other small components are mounted on plastic wafers with printed-circuit wiring (small units right and left, above). The wafers, in turn, are mounted on thin plastic boards, also with printed circuits (center, above). This modular construction reduces size of the system by 75%, increases reliability, reduces maintenance.

PRINTED CIRCUITS OF COPPER AND ALL-TRANSISTOR DESIGN HELP MAKE 75% SIZE REDUCTION IN RCA DATA PROCESSOR



Modularized circuit elements are installed in the system by sliding them in place. Contacts on outside edge make possible quick checkout and testing without removing boards. Many thousands are used in each system.



The "501" is designed to handle paper work—bills, reports, payrolls, etc.—accurately, economically, and at extremely high speed. It serves businesses ranging from banks and utilities to steel mills.

With the growing importance of miniaturization and reliability in electronics and nucleonics, Anaconda electrical copper products take new and varied forms—find new and more sophisticated uses.

In the compact new all-transistor data processing system shown above, the printed circuits are etched from Anaconda "Electro-Sheet" copper foil. This is electrodeposited paper-thin copper with quality carefully controlled to meet NEMA specifications. Bright on one side, it has a matte finish on the other for a firm bond to the circuit board. "Electro-Sheet" is furnished in various thicknesses to exceptionally close tolerances.

In other fields, the growing need for compact electrical assemblies which can handle high current densities calls for hollow copper conductors for fluid cooling. And for new environmental conditions, more difficult application needs, there are new copper alloys.

METALLURGICAL ASSISTANCE. Whatever your problem in electrical conductors, Anaconda metallurgical specialists will gladly help you select the metal—and the form or shape—best suited to your needs. See your American Brass representative or write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

ANACONDA®

ELECTRICAL COPPER PRODUCTS

Made by The American Brass Company

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 24.70; ingots, 26.80, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 28.60; No. 43, 28.40; No. 195, 29.40; No. 214, 30.20; No. 356, 28.60; 30 or 40 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 24.50-25.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.30 per lb deld.

Cobalt: 97.99%, $1.75 per lb for 500-lb keg, $1.77 per lb for 100 lb case; $1.82 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 30.00-31.50 deld.; custom smelters, 33.00; lake, 31.50 deld.; fire refined, 29.75-31.25 deld.

Germanium: First reduction, less than 1 kg, 38.30 per gram; 1-10 kg, 33.30 per gram; 10 kg or more, 31.30 per gram; intrinsic grade, 33.30-35.30 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $75-80 per troy oz nom.

Lead: Common, 12.80; chemical, 12.90; corroding, 12.90, St. Louis. New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 50 lb, $11 per lb, f.o.b. Minneapolis; 50-99 lb, $10; 100-499 lb, $9.50; 500 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $223-225 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-100 per troy oz nom.

Palladium: $18-20 per troy oz.

Platinum: $77-80 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $122-125 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom.; sheet, $55 per lb nom.

Tellurium: $2.50 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 102.375.

Titanium: Sponge, 99.3 + % grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99 + % hydrogen reduced, $3.30-3.80.

Zinc: Prime western, 12.00; brass special, 12.25; intermediate, 12.50, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 13.25; special high grade, 13.50 deld. Diecasting alloy ingot No. 3, 15.25; No. 2, 15.75; No. 5, 15.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $7 per lb; 100-500 lb, $6.50 per lb; over 500 lb, $6 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 26.00-27.75; No. 12 foundry alloy (No. 2 grade), 23.75-24.00; 5% silicon alloy, 0.60 Cu max., 25.00; 13 alloy, 0.60 Cu max., 25.00; 195 alloy, 26.75-27.00; 108 alloy, 24.25-24.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 24.50; grade 2, 23.25; grade 3, 22.25; grade 4, 21.50.

Brass Ingot: Red brass, No. 115, 29.25; tin bronze, No. 225, 39.75; No. 245, 33.50; high-leaded tin bronze, No. 305, 33.50; No. 1 yellow, No. 405, 23.75; manganese bronze, No. 421, 26.75.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.91, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.89, f.o.b. Temple, Pa.

COPPER WIRE

Bars, soft, f.o.b. eastern mills, 20,000-lb lots, 36.85; l.c.l., 37.48. Weatherproof, 20,000-lb lots, 37.42; l.c.l., 38.17.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $18.50 per cwt; pipe, full coils, $18.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $7.25-17.00; sheared mill plate, $5.25-10.00; wire, $5.75-10.00; forging billets, $3.55-5.75; hot-rolled and forged bars, $4.25-7.50.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 26.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100, 3003 and 5005 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.250-0.136	42.80-47.30	.....
0.136-0.096	43.20-48.30	.....
0.126-0.103	.....	39.20-39.80
0.096-0.077	43.80-50.00	39.30-40.00
0.077-0.068	44.30-52.20	.....
0.077-0.061	.....	39.50-40.70
0.068-0.061	44.30-52.20	.....
0.061-0.048	44.90-54.40	40.10-41.80
0.048-0.038	45.40-57.10	40.60-43.20
0.038-0.030	45.70-62.00	41.00-45.70
0.030-0.024	46.20-53.70	41.30-45.70
0.024-0.019	46.90-56.80	42.40-44.10
0.019-0.017	47.70-54.10	43.00-44.70
0.017-0.015	48.60-55.00	43.80-45.50
0.015-0.014	46.60	44.80-46.50
0.014-0.012	50.80	45.50
0.012-0.011	51.00	46.70
0.011-0.0095	53.50	48.10
0.0095-0.0085	54.60	49.60
0.0085-0.0075	56.20	50.80
0.0075-0.007	57.70	52.30
0.007-0.006	59.30	53.70

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in. 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.40	47.20
5050-F	43.50	48.30
3004-F	44.50	50.20
5052-F	45.10	50.90
6061-T6	45.60	51.70
2024-T4	49.30	56.10
7075-T6*	57.60	64.70

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	76.90	73.90	....	....
0.250	62.00	60.20	89.10	76.60
0.375	61.20	60.00	73.50	68.50
0.500	61.20	60.00	73.50	68.50
0.625	61.20	60.00	69.80	64.20
0.750	59.70	58.40	63.60	60.40
0.875	59.70	58.40	63.60	60.40
1.000	59.70	58.40	63.60	60.40
1.125	57.30	56.10	61.50	58.30
1.250	57.30	56.10	61.50	58.30
1.530	57.30	56.10	61.50	58.30
1.500	57.30	56.10	61.50	58.30
1.625	55.00	53.60	....	56.20
1.750	55.00	53.60	60.30	56.20
1.875	55.00	53.60	....	56.20
2.000	55.00	53.60	60.30	56.20
2.125	53.50	52.10	....	....
2.250	53.50	52.10	....	56.20
2.375	53.50	52.10	....	....
2.500	53.50	52.10	....	56.20
2.625	....	50.40	....	....
2.750	51.90	50.40	....	56.20
2.875	....	50.40	....	....
3.000	51.90	50.40	....	56.20
3.125	....	50.40	....	....
3.250	....	50.40	....	....
3.375	....	50.40	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 42.20-55.00; 6061, 41.60-55.00; 7075, 61.60-75.00; 7070, 66.60-80.00.

Pipe: ASA schedule 40, alloy 6063-T6 standard length, plain ends, 90,000 lb base, dollars per 100 ft. Nominal pipe sizes: ¾ in., 18.85; 1 in., 29.75; 1¼ in., 40.30; 1½ in., 48.15; 2 in., 58.30; 4 in., 160.20; 6 in., 287.55; 8 in., 432.70.

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	42.70-44.20	51.30-55.50
12-14	42.70-44.20	52.00-56.50
15-17	42.70-44.20	53.20-58.20
18-20	43.20-44.70	55.20-60.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-75.30	90.60-91.30
36-38	66.10-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.50-23.75; No. 2 heavy copper and wire, 21.50-21.75; light copper, 19.50-19.75; No. 1 composition red brass, 18.50-18.75; No. 1 com-

BRASS MILL PRICES

MILL PRODUCTS a

	Sheets, Strip, Plate	Rod	Wire	Seamless Tubes
Copper	54.63b	52.86c	....	55.82
Yellow Brass	48.32	33.66d	48.86	51.73
Low Brass, 80%	51.28	51.22	51.82	54.59
Red Brass, 85%	52.33	52.27	52.87	55.64
Com. Bronze, 90%	53.92	53.86	54.46	56.98
Manganese Bronze	56.62	50.28	60.72	....
Muntz Metal	50.95	46.21	....	....
Naval Brass	52.90	46.71	59.46	56.31
Silicon Bronze	60.67	59.86	60.21	78.35
Nickel Silver, 10%	63.88	66.21	66.21	....
Phos. Bronze	75.34	75.84	75.84	77.02

SCRAP ALLOWANCES e (Based on copper at 31.50c)

	Clean Heavy	Rod Ends	Clean Turnings
Copper	27.500	27.500	26.750
Yellow Brass	20.750	19.875	18.875
Low Brass, 80%	23.250	23.000	22.500
Red Brass, 85%	24.250	24.000	23.500
Com. Bronze, 90%	25.250	25.000	24.500
Manganese Bronze	19.375	19.125	18.500
Muntz Metal	19.375	19.125	18.625
Naval Brass	19.250	19.000	18.500
Silicon Bronze	27.000	26.750	26.000
Nickel Silver, 10%	25.625	25.375	12.810
Phos. Bronze	28.625	28.375	27.375

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 17.50-17.75; new brass clippings, 15.50-16.00; light brass, 12.00-12.50; heavy yellow brass, 13.00-13.50; new brass rod ends, 13.50-14.00; auto radiators, unsweated, 14.00-14.50; cocks and faucets, 14.75-15.25; brass pipe, 15.00-15.50.

Lead: Soft scrap lead, 8.75-9.25; battery plates, 4.50-4.75; linotype and stereotype, 10.00-10.50; electrotype, 8.25-8.75; mixed babbitt, 9 25-9.75.

Monel: Clippings, 30.00-32.00; old sheets 26.00-28.00; turnings, 20.00-22.00; rods, 30.00-32.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 39.00-40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 3.25-3.50; new diecast scrap, 3.00-3 25; old diecast scrap, 1.75-2.00.

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.50-15.00; mixed high copper clips, 12.50-13.00.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 12.25-12.75; clean borings and turnings, 10.00-10.50; segregated low copper clips, 16.75-17.25; segregated high copper clips, 16.00-16.50; mixed low copper clips, 16.00-16.50; mixed high copper clips, 15.75-16.25.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.50-1175; clean borings and turnings, 10.50-11.00 segregated low copper clips, 15.75-16.25; segregated high copper clips, 14.75-15.25; mixed low copper clips, 15.25-15.75; mixed high copper clips, 14.25-14.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 57.50; light scrap, 52.50; turnings and borings, 37.50.

Copper and Brass: No. 1 heavy copper and wire, 26.25; No. 2 heavy copper and wire, 23 25; light copper, 20.50; refinery brass (60% copper) dry copper content, 23.75.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 26.25; No. 2 heavy copper and wire, 23.25; light copper, 20.50; No. 1 composition borings, 21.25; No. 1 composition solids, 21.50; heavy yellow brass solids, 16.00; yellow brass turnings, 14.00; radiators, 17.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.30.

Copper: Flat-rolled, 47.79; oval, 46.00, 5000-10,000 lb; electrodeposited, 41.00, 2000-5000 lb lots; cast, 43.50, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 120.50; 200-499 lb, 119.00; 500-999 lb, 118.50; 1000 lb or more, 118.00.

Zinc: Balls, 19.50; flat tops, 19.50; flats, 22.25; ovals, 21.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.30 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,-000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.35; 2000-5900 lb, 13.35; 6000-11,900 lb, 13.10; 12,000-22,900 lb, 12.85; 23,000 lb or more, 12.35.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,990 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 79.50; 100-600 lb, 70.20; 700-1900 lb, 67.40; 2000-9900 lb, 65.60; 10,000 lb or more, 64.20.

Stannous Chloride (Anhydrous): 25 lb, 155.00; 100 lb, 150.10; 400 lb, 147.70; 800-19,900 lb, 106.80; 20,000 lb or more, 100.70.

Stannous Sulphate: Less than 50 lb, 140.20; 50 lb, 110.20; 100-1900 lb, 108.20; 2000 lb or more, 106.20.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page* 191)

bringing out more material, the market undertone continues strong. Export demand remains heavy enough on the major open hearth grades to take up any slack.

• **New York** — Brokers' buying prices are firm. While domestic requirements for steel scrap are spotty, export demands are holding up. There's a strong possibility that the domestic market will be active when the strike ends.

• **Cleveland**—While market activity is limited, dealers and brokers have a bullish outlook, in anticipation of strong demand after the steel mills resume operations. They think good business will be experienced through next spring because a shortage of iron ore is possible (due to the abbreviated lake shipping season). It could compel steelmakers to increase the amount of scrap in their open hearth melts. On the basis of recent purchases in the Valley, No. 1 heavy melting is quoted $39-$40 in Cleveland, $43-$44 in the Valley.

• **Youngstown**—Cutbacks in operations by steel fabricators will shortly begin to reduce the inflow of scrap to dealers' yards. Large stocks of scrap have been built up, especially the No. 2 grade, and this will help out steelmakers if there's a serious shortage of iron ore next winter and spring.

• **Buffalo**—Some dealers feel current market optimism may gradually turn to pessimism if the steel strike drags on indefinitely. Scrap stocks in dealers' yards are beginning to mount. A huge volume of industrial material is being generated. It will hit the market as soon as the mills resume production, taking the edge off demand for dealer grades.

• **Cincinnati** — The market is strong. Dealer outlook is bullish in anticipation of active poststrike demand. In the absence of local buying, prices are unchanged, with brokers quoting $35.50-$36.50 on No. 1 heavy melting.

• **St. Louis**—Prices are spotty, with the mills reluctant to place orders, and dealers apparently are not anxious to book business. There has been a noticeable rise on the open hearth grades of scrap as the result of special out-of-town deals. Higher prices are expected when the strike ends.

• **Houston**—Exporters and brokers are scrambling for premium grades of scrap. As a result, prices are firm. Commitments to the Lone Star mill are being filled slowly despite relatively strong prices.

South Texas broker buying prices for Mexico are up $1 a ton to $45 for No. 1 heavy melting. Further Mexican purchases are expected.

In Houston and other western gulf ports, thin supply has exporters scrambling and No. 1 heavy melting prices range from $39 at Houston to $40-$41 for spot purchases in Baton Rouge, La., and New Orleans.

• **Birmingham** — The market is steady at higher prices established about ten days ago. Purchasing is limited. Several large users recently raised their prices on material ordered for delivery through October. With most cast pipe manufacturers out of the market, the cast scrap market is soft, prices having declined $1 a ton. The export market is firm.

• **San Francisco**—Japanese demand for scrap is heavy. Market observers feel that once the domestic steel mills resume operations, an upward adjustment in prices will follow.

• **Los Angeles**—Demand for scrap on export account continues active.

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Grinding Capacity

Have extra-fine grinding capacity and will custom grind ores such as Iron, Manganese, Chrome, Zirconium, etc., to buyer's specifications.

Prefer inquiries for carload shipments.

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WE CAN HELP YOU TO CONTACT high calibre men to fill specific jobs you have in mind—

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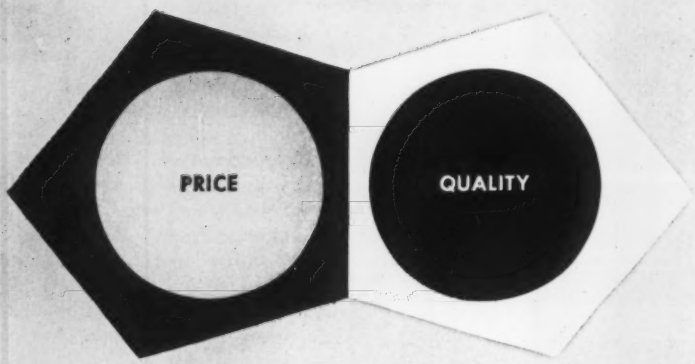

— in buying blast cleaning abrasives, too, low price is just an illusion.

It's not the price per ton, but abrasive quality and resultant performance that control your actual blast cleaning costs. Over 950 field tests against lower priced steel abrasives have proven that top quality WHEELABRATOR Steel Shot can cut your abrasive costs as much as 50%! Start saving now with WHEELABRATOR Steel Shot!

WRITE TODAY FOR THIS NEW HANDBOOK
of blast cleaning abrasive performance data, full of charts and facts to help you control abrasive consumption and cleaning costs. *Write to Wheelabrator Corp., 505 South Byrkit St., Mishawaka, Ind.*

WHEELABRATOR
STEEL ABRASIVES

Domestic demand is slow. Dealers expect prices to rise when the strike ends.

• **Seattle** — The scrap market is quiet, and prices are unchanged but nominal. Lack of storage space is hampering some dealers who are heavily stocked. Little tonnage is moving and sales are few. Japanese buyers are holding off placement of new business until the market situation here clarifies.

Strike Hampers Shipyards In Pacific Northwest

The Pacific Northwest shipbuilding industry is being severely hampered by labor trouble. Workers are on strike and executives say union demands are untenable, making competition with yards in other areas impossible.

For the first time in peacetime, yards from San Francisco north, involved in the current controversy, have major combatant and noncombatant vessel contracts on hand. Work on these vessels is being delayed and yard operators predict losses on the contracts, with future competition out of the question, if the union demands are granted.

Scullin Steel to Make Some Conversion Ingots

Scullin Steel Co., St. Louis, a division of Universal Marion Co., has signed a contract to produce steel ingots to be delivered to the Granite City Steel Co., Granite City, Ill., for melting and rolling. It was not stated how long the conversion deal will continue. Scullin has been operating during the strike, as has Granite City Steel and Laclede Steel Co., all in the St. Louis area.

Pig Iron . . .

Pig Iron Prices, Page 186

Pig iron supplies are adequate to cover nearby needs, but will tighten over the balance of this year. Reserve stocks at furnaces still operating are dwindling sharply as a result of steady foundry demand.

When steel mills get back into operation, they won't have a lot of iron available for shipment to the merchant trade because of their own hot metal needs.

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Complete range of stretching capacities from 150 to 750 tons, for levelling ferrous and non-ferrous sheets in sizes up to 120" wide x 500" long.

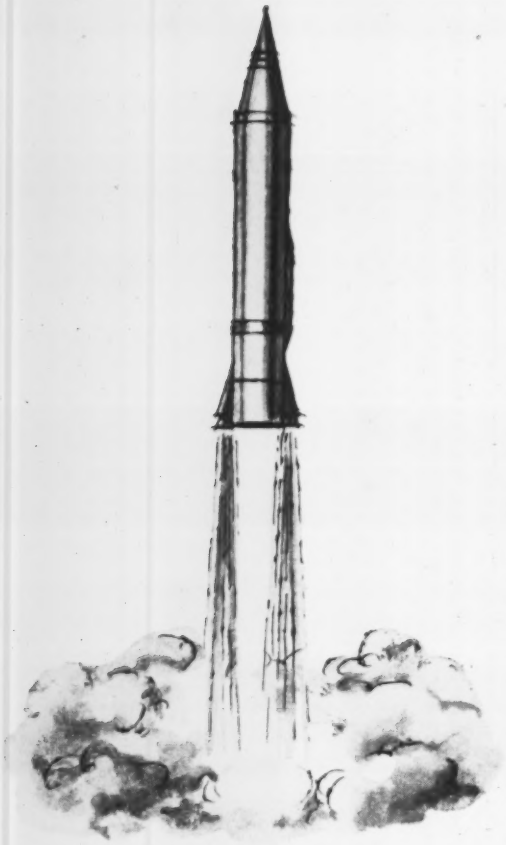
Speeds and length of "stretch" to meet all requirements.

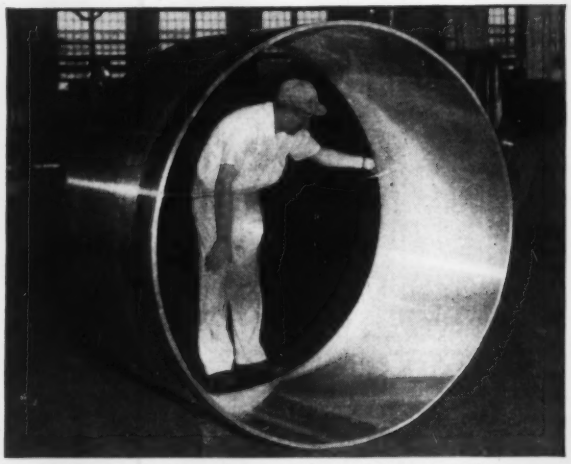
Adaptable for automatic cycling.

Bar Mills • Merchant Mills • Sheet and Strip Mills • Pinion Stands
Roller Tables • Reduction Drives
Stretcher Levellers • Roll Lathes • Guillotine Shears
Special Machinery • Sheet Mill Shears • Machine Work

Hyde Park
FOUNDRY and MACHINE CO.
HYDE PARK
Westmoreland County, Pa.

Rolls
Rolling Mill Equipment
Gray Iron Castings





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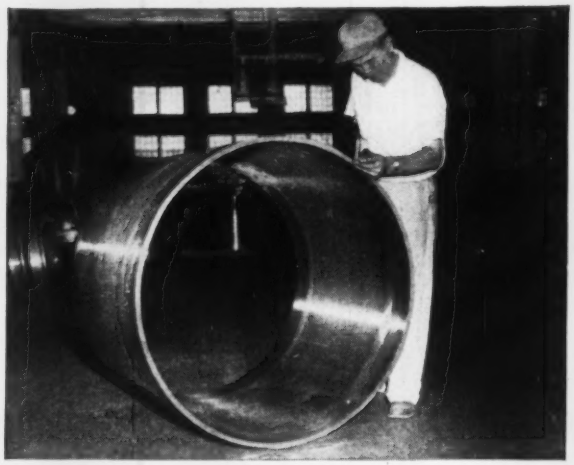

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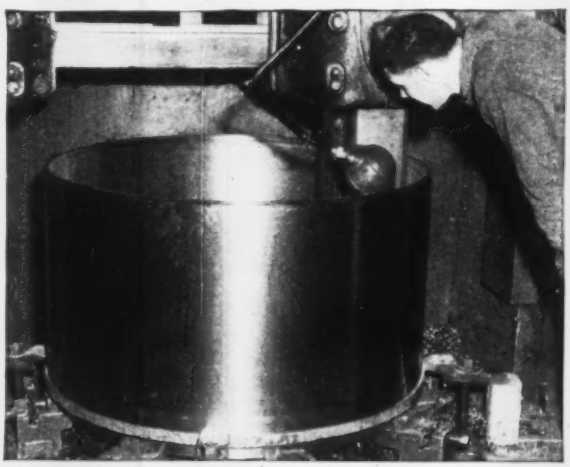

Third stage motor case ring—air-melted AMS-256 steel

QUALITY OF "MINUTEMAN" MISSILES PARTS DETERMINED BY STANDARD STEEL WORKS RESEARCH

Months of research and development of various rigid quality-control procedures at Standard Steel Works Metallurgical Laboratories preceded the delivery of "Minuteman" missiles parts of extremely high-quality material.

Standard Steel Works' laboratory facilities—second to none in industry—make possible delivery of unusual forgings from special steel alloys in record time. Missiles parts of the highest cleanliness ratings have been furnished from both air and vacuum melted steel. All are subjected to ultrasonic inspection under water for defects and to microscopic examination for cleanliness.

Standard Steel Works Division

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BURNHAM, PENNSYLVANIA

Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes

BALDWIN BLH LIMA-HAMILTON

"Rotoblast Steel Shot cuts abrasive costs in half!"

Rotoblast Steel Shot reduces abrasive consumption more than 50% at Atlantic Steel Castings

"Talk about a rugged cleaning job!" says Mr. William Burrows, Plant Manager, Atlantic Steel Castings Co., Chester, Pa. "Our castings are carbon and low alloy steel, running as big as eight tons each. We used to think we had a good abrasive until we tried Rotoblast Steel Shot. Our tests proved (and we double-checked them to make sure) that Rotoblast cut our consumption per wheel hour to less than half. That means our abrasive costs are cut exactly in half! Also we've found that Rotoblast gives us the kind of finish that our customers in the railroad, steamship, steam turbine* and automotive industries demand."

Prove Rotoblast's cost-cutting qualities in *your* plant. To arrange a trial, talk to your Pangborn man or write PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Blast Cleaning and Dust Control Equipment—Rotoblast Steel Shot and Grit.*

**The toughest castings in industry to clean.*

Pangborn

ROTOBLAST® STEEL SHOT AND GRIT

Cutler-Hammer 505 Mill Brakes

now in seven sizes . . .
first complete line to meet the latest AISE-NEMA Standards

These are the features that have made the Cutler-Hammer 505 Mill Brake the choice of Mill Engineers everywhere. Compare it . . . test it . . . prove it. The 505 Mill Brake is built better to last far longer.

Only ten major components; the ultimate in design simplicity . . . avoids the clutter and trouble of complex linkage systems.

Over-the-wheel pull rod provides a one-to-one leverage ratio; reduces the lower bearing pressure by absorbing half the braking force.

Single, weatherproof operating coil easily accessible and reversible. Leads can be brought out in either direction.

Shoe clearance can be adjusted even in total darkness. No dials to read, no sticking gauges, no complicated mechanisms to maintain.

All adjustments made with an ordinary wrench, and all nuts are above the motor shaft for easy access.

No lubrication required. Oversize bearings have extremely low pressures; can't stick or bind.

Compact rectifier panels bring all the plus features of the rugged 505 Mill Brake to jobs where only A/C power is available.

Get all the facts before you decide. Write today for detailed description and data. Bul. 505-T213. Cutler-Hammer Inc., Milwaukee 1, Wisconsin.

CUTLER-HAMMER CONTROL C-H

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